THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

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DOROTHY EBEL HANSELL
Editor

October 3, 1959. "Greenhouse Gambol" of the Sasqua Garden Club, Fairfield, Connecticut.

October 6, 1959. Theater Benefit sponsored by the Volunteer Associates of The New York Botanical Garden—"Gypsy," starring Ethel Merman, Broadway Theater, New York City. Proceeds for the Garden's over-all program of world-wide exploration, horticulture, botanical research and education.

October 7-10, 1959. Fourteenth American Horticultural Congress, Hotel Sheraton, Rochester, New York. For information: Bernard Harkness, Highland Park Herbarium, 5 Castle Park, Rochester, New York.

October 14, and November 10, 1959. "Open Garden Days" at The New York Botanical Garden for garden club members of The New York Botanical Garden and educational groups.

October 24, 1959. Children's Annual Chrysanthemum Arranging Contest at the Garden in cooperation with the Office of Nature Study and Gardening of the Board of Education of the City of New York.

October 24 and 25, 1959. Show of Westchester Chapter, National Chrysanthemum Society, Inc., at Rye Country Day School, Rye, New York.

October 30 and 31, and November 1, 1959. Sixteenth Annual Show and Meeting of the National Chrysanthemum Society, Inc., at Carter Hotel, Cleveland, Ohio. For information: Howard C. Noll, 3185 West 39th Street, Cleveland 9, Ohio.

November 6, 1959. Chrysanthemum Show in the Conservatory of The New York Botanical Garden opens.

November 6-8, 1959. Annual Chrysanthemum Show of the Pennsylvania Horticultural Society, Field House, Swarthmore College, Swarthmore, Pennsylvania.

November 18, 1959, 2:30 P.M. Illustrated lecture on "Man's Search for Paradise in Gardens" by Dr. Clement Gray Bowers, at French Institute, 22 East 60th Street, New York City. Open to the public without charge, by The Garden Club of America.

December 17, 1959. Christmas Show opens in the Conservatory of The New York Botanical Garden. Note change from previously announced opening date.

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CREDIT FOR ILLUSTRATIONS

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PEERING INTO THE FUTURE

By **Edwin B. Matzke**

Dr. Matzke, Chairman of the Department of Botany, Columbia University, delivered this address at the reception for Graduates in the Two-Year Course in Botany and the Two-Year Course in Practical Gardening at The New York Botanical Garden, June 18, 1959. Dr. Matzke is a member of the Board of Managers of The New York Botanical Garden, appointed by Columbia University.

SINCE SOME OF YOU are students of horticulture and practical gardening, and others have taken courses in botany, some general reflections relating to plant science may be more appropriate at this time than consideration of a detailed scientific topic. There are three broad thoughts dealing with plant science that I should like to discuss and leave with you as you go forth from the Garden with your certificates tonight. These are: the importance of horticulture in the past, the present and the future; the revolution that is still to come in agriculture; and the broadened concept of evolution as applied to the universe.

Civilized man has and always has had a craving for beauty. Helen of Troy is remembered after more than three thousand years as the most beautiful woman in Greece. The fame of the Hanging Gardens of Babylon, one of the seven wonders of the ancient world, with their superimposed series of arch-supported terraces, their fountains, their exquisite plants, has echoed through more than twenty-five centuries. But in the number of genera and species represented, as well as in attractiveness of horticultural varieties, The New York Botanical Garden of 1959 undoubtedly far surpasses the Gardens of Babylon.

In countless smaller ways the appreciation of beauty through plants achieves expression. In Arnhem, in the Netherlands, dwellers in the newly erected apartment houses each have a plot of ground, as nearby as possible, where they raise flowers; the plaza before the new post office in Bergen, Norway, glows in August with row upon row of tuberous begonias; hundreds of people gather around the floral clock in West Princes Street Gardens in Edinburgh after a concert on a Sunday evening to enjoy the plants of which it is fashioned, and, in silence, to hear it strike; a year ago a Belgian girl, on her first visit to America, stood on the upper deck of a small Dutch ship as it sailed up New York harbor; as the morning mists lifted and the coastline and the New York skyline came into view, her first comment was not about the skyscrapers, but "How pleasantly green it looks, compared with the harbors of Europe."

On a larger scale are the impressive displays in the great botanical gardens. The bicentenary of the Royal Botanic Gardens at Kew is being celebrated this year. Lilac time in Kew has been immortalized in Alfred Noyes' poem "The Barrel Organ." Hardly less striking there are the massed effects, in sequence, of daffodils, Japanese cherries, flowering crab, bluebells, rhododendrons, and other collections.

Certainly one of the innate rewards of gardening is in making the world more beautiful, and the distinction between the beautiful and the spiritual is not always sharp. We do not usually conceive of ugly angels. A botanist comes into contact with gardeners—not the planners, but the real gardeners, who spade the fertilizer into the soil, and who get down on their knees and with their hands pull up the knotweeds, the purslane, the galinsoga and the wood sorrel from the flower beds. The gardeners whom I have known have all had two things in common: none of them have been wealthy, and all of them have been contented. In a spiritual sense, gardening is its own reward, and whatever the future may bring, there is no indication that men will tire of gardens.

The second thought that I should like to leave with you is not unrelated to this, although at first it may seem to be. It is that the great revolution in agriculture is still to come. Agriculture started some eight thousand to ten thousand years ago, when man ceased being a nomad and began having domesticated animals and raising cultivated plants. Since that time many of the ways of life have changed completely. These include systems of transportation, means of communication, and methods of warfare. Early man was dependent for transportation either on his own locomotion or upon beasts of burden. Even in more recent times, Columbus took seventy days to cross the Atlantic on his first voyage, and the pilgrims in the Mayflower required sixty-three, compared with five to six hours in jet planes at present; and there is good indication that this will be reduced to one to two hours in the not distant future. Similarly, messages, which originally could only be sent vocally, or by messenger, or at night by lights, can now be transmitted almost instantaneously to any part of the earth, or for that matter bounced from the moon or the planets. And, of course, warfare is no longer a case of hand-to-hand combat.

Although it may seem crude to say so, physically the most important thing that we do is eat, and the basis of our food is agriculture. Fundamentally agriculture has not changed, even though new varieties have been introduced, and somewhat higher yields can be obtained. Not only are the techniques of agriculture—the planting of seeds, the raising and harvesting of crops—essentially the same as those of prehistoric man — or more probably of prehistoric woman — but the plants and animals used are the ones that they developed. As Dr. E. D. Merrill, for many years Director of The New York Botanical Garden, pointed out emphatically, not a single important food plant or domesticated animal has been brought into use since the dawn of recorded history. Each of the three ancient centers of civilization really grew up around a grass plant — rice in the Orient, wheat in Asia Minor, and Indian corn in the New World, although in each of these cases there were other cultivated plants in addition.

Fundamentally food is a source of energy, and we are complicated mech-

anisms for the release of that energy; while we can release that energy we are alive, and when we no longer can, we die. The source of this energy is sunlight, stored by plants. In a real sense, we are creatures of the light.

Precise figures are difficult to obtain, and vary greatly, but it has been calculated that at a maximum about 3.5% of the light which strikes a leaf is used in photosynthesis, while the chloroplasts, which are the important centers in the process of energy storage, have an efficiency of eighty-five to ninety-five percent. Furthermore it has been estimated that crops like corn and wheat use not more than about 0.1% of the light energy which strikes a field in the course of a year, and only a fraction of this goes into the edible part of the plant. After all an efficiency of a small fraction of one percent is exceedingly low; in steam engines, which are not efficient, it is about 12.5%; Diesels do much better. More intensive agriculture may increase yields several fold; utilizing algae, like *Chlorella,* may give yields twelve or even perhaps twenty-five times as great; but compared with the total energy available, this is still an incredibly low efficiency.

If the mechanisms involved in energy storage by plants were understood, there is no basic reason why much higher yields could not be obtained, without the use of plants at all, by harnessing light energy directly. An efficiency of twenty-five percent would immediately increase yields two hundred and fifty times, and five hundred times would be entirely possible. If this were done, using the latter figure, energy storage equivalent to that of all the agricultural produce now raised in the United States could be accomplished in an area approximately 1/30 the size of Arizona, or 1/13 that of New York State. Actually the energy of sunlight would not be essential, but it would be an easily available, "free" source. Lest there be objections to such "synthetic" food, this could be fed to animals — we could still eat steak. The real answer to Russian sputniks is not necessarily in bigger and better sputniks.

It may take several hundred years to learn what the complicated steps in photosynthesis are, so that the process may be carried on without plants. But after that the agricultural revolution will come very rapidly, probably in one or a few generations. With it will come an entirely new economic and social reorganization, such as the world has not known since agriculture first began, and the Malthusians will be more wrong than ever.

Here the horticulturists will also play an important role. It is hoped that the present agricultural areas of the United States, including the great granary in central North America, will be converted into a garden far surpassing those that have ever been realized.

The third thought that I should like to leave with you, again, may not seem to be closely related to the other two, but actually it also is not too far distant. It is just a century since the publication of Darwin's book ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION in 1859. If Darwin were alive to-day, he would undoubtedly be gratified that his concept of organic evolution, which caused so much controversy in his day, has been so universally accepted by informed people; he would be pleased that, especially within the last two decades, his views have been greatly extended in both time and space; and he would probably be somewhat disappointed that greater progress has not been made in changing one living form into another experimentally.

Estimates of the age of the universe range from about five billion to some thirteen billion years, with five and a half to seven billion the more usually accepted figure. The universe started presumably as protons, neutrons and electrons. Even today hydrogen constitutes ninety-three percent of the total number of atoms and seventy-six percent of the weight of matter in the universe; helium comprises twenty-three percent of the weight, and all the heavier elements beyond helium account for only about one percent of the mass of the universe. Apparently the other elements were built up more or less in sequence. Spectroscopic and other analyses indicate that the elements throughout the universe—the stuff of which it is made—are the same as those on the earth, and subject to the same physical and chemical laws.

From the elements simple compounds were formed on the primitive earth — such as methane, ammonia, and water vapor. It has been demonstrated experimentally that by subjecting gases such as those present on the primitive earth —hydrogen, ammonia, methane, and water vapor — to electric discharges, amino acids are formed; carbon monoxide may be substituted for methane, and ultraviolet radiation for electrical discharges. Amino acids are important constituents of proteins, and proteins in turn are basic to protoplasm. In a primeval broth life apparently started through the accumulation and interaction of such substances, more than two and a half billion years ago, on the earth. This is the modern concept of spontaneous generation of life. Furthermore, only certain biochemical combinations are possible, and some of these, at least, occur spontaneously. This is undoubtedly part of the story of evolution. Given the conditions present on this earth, the origin of life was not an accident—it was inevitable, and so is the evolution of life, once it had begun. The types of evolution, such as chemical and biological, are merging.

But the story goes further than this. The conditions under which life can exist are relatively limited — with regard to such factors as temperature, moisture, light, and irradiation. In spite of rather narrow limits, life as we know it has apparently existed more than two and a half billion years on the earth. Delicate ferns, for instance, tucked in the crevices of the rocks in the Appalachians have survived while those mountains have been raised and worn down several times. A planet like the earth, satisfying the conditions for continued life, may seem to be an unlikely occurrence in the universe. But it has been estimated that in our galaxy, in which our sun is an undistinguished peripheral star, there are probably one hundred thousand planets like our earth, and within the range of the most powerful telescopes there are some one hundred million galaxies. Since the stuff of the universe is the same, life as

(Continued on page 169)

"THE NAME'S THE THING"

By **Bride McSweeney**

Miss McSweeney, who is in charge of the Plant Record Section of the Gardening Department, has been employed at The New York Botanical Garden since 1943.

THIS TITLE serves well to introduce the Plant Record Section. This is the motto which it keeps before it at all times, for its primary concern is with plant names.

But what's in a name, aye—there's the rub! Gertrude Stein chirps "A rose is a rose is a rose." Here at The New York Botanical Garden this would be the worst of "faux pas" for a rose is not just a rose but a specific rose from a specific place with a specific name. Thus a rose may be *Rosa centifolia* from the Caucasus, or *Rosa carolina* from eastern United States.

It is the earnest endeavor of the Plant Record Section to keep all of the plants at the Garden carefully identified, labeled and mapped to best serve the public, students of horticulture and botany, and the staff of The New York Botanical Garden.

First — what is the Gardening Department and its so-called sections? It is that division of The New York Botanical Garden which, under the direction of Louis P. Politi, Horticulturist, is responsible for the growing and maintenance of all cultivated plants in the Garden. Therefore it represents the apparently unseen focal point of The New York Botanical Garden. Without this important division, the institution may very well be referred to as The New York Botanical Herbarium, The New York Botanical Library, or The New York Botanical What-have-you; but it is a Botanical Garden and it is the aim of this Department to help make it the best of its kind.

The Gardening Department is divided into five sections: 1. The Main Conservatory (Range #1) which houses various collections of greenhouse plants including cacti and succulents, ferns, tropical foliage, palms, orchids, plants of economic use, and seasonal shows such as the chrysanthemum, Christmas and Easter shows, and special educational exhibits. 2. The Propagating Range (Prop #2) which is responsible for the propagation of greenhouse and outdoor plants and the nursing back to life any sick members of the plant kingdom. 3. The Arboretum which maintains all trees and shrubs grown at the Garden, having a nursery for its seedlings, young plants, and special collections. 4. The Outdoor Flower Gardens which is responsible for the planting and maintenance of all annual and herbaceous material, including the Rock Garden, the Rose Garden, and a nursery. Last, but by no means least (prejudice) Plant Records.

This is the section with a graphic and historical *past*, a crowded and bustling *present*, and what looks like a perpetually hustling *future*.

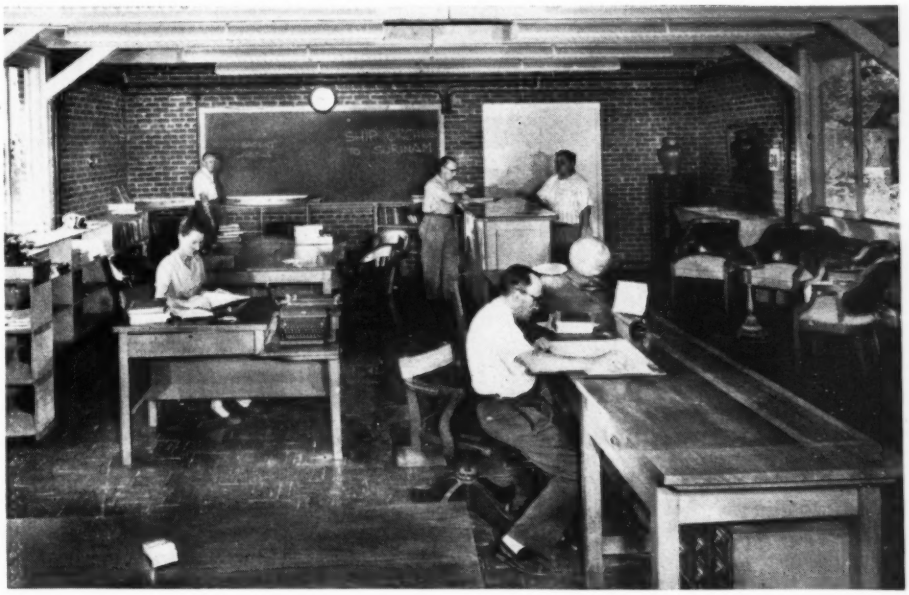
A graphic and historical *past* because only in its archives can botanical researchers find full background of all plants ever grown by the Gardening Department whether they were received in the form of cuttings, roots, tubers, bulbs, seeds, collected on expeditions, purchased from commercial sources, donated by plant enthusiasts, or through seed exchange—or even "swiped."

There doesn't seem to be any *present*, at least at par level. That mountain of emergent tasks makes it a perpetual sweat-box of sifting, sorting, and shoveling out the myriad of extras, all of which seem to be magnetized toward it. Only a tape recorder and fast-moving camera could show in a very small way some of the duties performed within and without the four brick walls of its headquarters. It is the pivot or point of contact for the other four sections. In effect it is that little division in the Gardening Department which is never seen but ever sought, and only those working in it appreciate and even enjoy its dead-line turmoils and are geared for unexpected action.

A hustling *future* is unavoidable for as long as the Garden exists it must maintain a system of living, dead, or discarded plant records; otherwise, it would very soon lose its significance as a botanical garden. According to the present pace of ever-increasing collections being grown by the Gardening Department, the Plant Record Section has a very busy schedule ahead.

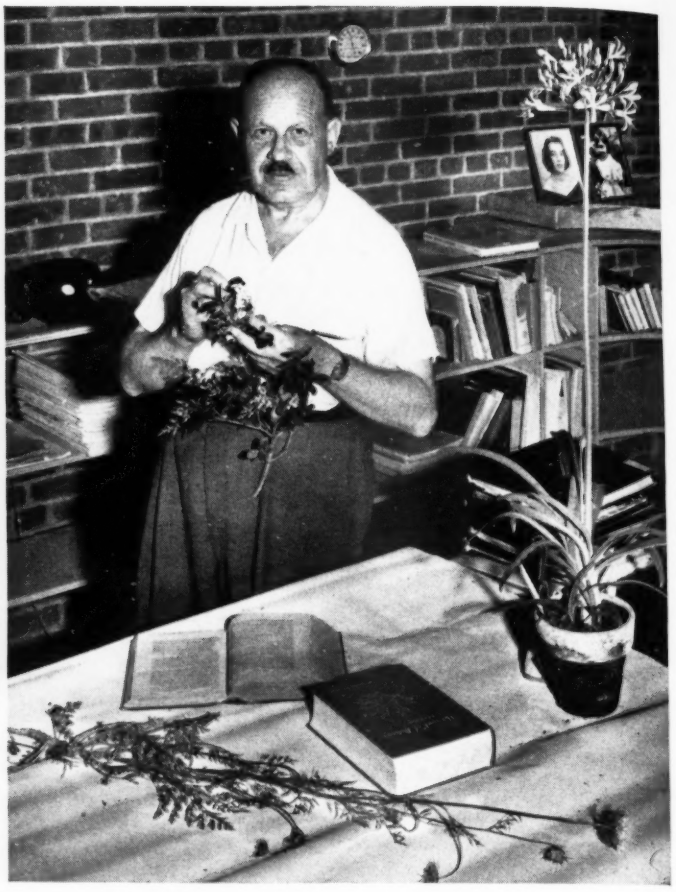
Where? . . . *What*? . . . and *Wherefore*?

Where? It is located in the hidden recesses of Prop #2, near the Snuff Mill. This red brick building, 'The



Louis Politi, Horticulturist, confers with Harry Goode in the Plant Records Section of the Gardening Department, while Joe Kilz is at the blackboard and Bride McSweeney and Charles Czarnecki are at their desks.

Bride McSweeney, Plant Records Foreman, looks up information in an accession book.



Right. E. J. Alexander, Associate Curator of The New York Botanical Garden, assists the Plant Records Section in identifying plants. In his hands is *Ligustrum ovalifolium;* in the pot, *Agapanthus africanus;* and on the table *Daucus carota.*

Barn,' was originally constructed as a classroom which fortunately proved impractical as such, so Plant Records for the first time found itself the proud possessor of a well-lighted, compact, suitable work site and immediately dug in for action in its usual enthusiastic fashion. It serves as field headquarters for Mr. Politi, Horticulturist, and as a conference room for the Department's foremen, as well as a meeting place for plant society groups, such as the New York Unit of The Herb Society, or individuals who seek plant information, or who wish to contact the Horticulturist.

What? The functions of this little beehive are: a) primarily to keep plant records which in itself is a complicated and involved assignment dating back almost sixty years. It is responsible for the recording of all newly acquired plant material, of labeling each and, in the case of outdoor plants, of mapping the location where planted. This is where "The Name's The Thing" begins. The recording of a plant or "accessioning" means entering in numerical sequence in the accession book concise information on its background and making out a cross-reference card for its respective file—greenhouse, arboretum, and so forth. *But* first the name has to be checked, and the plant must be identified as such. When the all-clear is sounded on name and identification, the plant is then "branded" with a data tag which shows the name and its special institution or accession number. From now on it better be on its good behavior. If it happens to be an arboretum plant and set out on the grounds, it gets further attention in that its location is mapped. It now has to be on its extra good behavior and be able to withstand the ravages of the Indian Scouts during after school and vacation periods. b) The seed exchange entails corresponding with and exchanging several thousand packets of seeds with other botanical institutions and plant enthusiasts throughout the world. This means that the staff is ever on the alert for ripe seed on the grounds or in the greenhouses from January to December. Here again the names and seeds are checked. After seed lists are sent out, the Plant Record Section braces itself for the deluge of requests which pour in from botanical gardens from the four corners of the globe, and also for the influx of their exchange lists. c) The catalog file represents a collection of current catalogs of commercial sources of plant material and gardening supplies, wholesale and retail, domestic and foreign. A ready-reference card file is kept up-to-date on the latest offerings in the commercial field. Judging from the daily requests for information on sources of supply for rare and unusual plants, it would seem that more people are pursuing the strenuous and relaxing pleasures of gardening. d) Identification of unnamed plants. So many plants are received from expeditions and other sources which cannot be determined immediately that year-round alertness is necessary to spot any that may bloom and so aid in identifying them. E. J. Alexander, a member of the staff of The New York Botanical Garden, and one of the outstanding botanists in the United States, devotes some of his time to these identifications. e) Distribution of plant material involves the shipment of plants, seeds, cuttings, flowers, to members, institutions, classes and lectures.

Wherefore? While these are basically

the duties expected, all very well organized and so run, unfortunately things do not work out that way. Have you ever found yourself in the midst of five different projects at the same time without having time to find out how they came about? Well, spend an hour in Plant Records on almost any given day and this is what you find. Invariably there are imperative, concurrent demands which must be made and dealt with immediately. For instance, there's a rush request — from Mrs. Hansell, Garden Journal Editor, — the press is on the other phone in her office. Urgent! What's the status of the rose collection? What is the size of the planted area? How many old-fashioned? What, if any, were the winter losses? What new replacements or additions have been received or are expected? How do these compare with AAR Selections? All hands on deck—the making of maps and labels must be halted for the moment—to dig up the required information. While these answers are being scuttled up — an interruption. A Garden staff member enters accompanied by a Dr. Brown from Florida who is interested in aroids, especially in the anthuriums. Would it be possible for him to have a list of those in the Garden's collection? He has to catch a plane at Idlewild in a few hours and would appreciate having even a tentative list, and where they were collected or originated. The rose crew is now split to go into the aroid action. Excuse me! the phone! "Please check on the plants which were to be supplied for the class due to start in half an hour." And so hastily heading to speed up delivery—oh, no! not now! a shipment of young plants being delivered. This is Friday and mid-afternoon so they have to be taken care of immediately. For the moment, at least, these must wait. Where were we? Oh, yes! Plants for the class — they're ready but the gardener has a problem — part of the old label on a plant is broken, and he can't quite determine if this is a variety or the true species. Back to check the accession number on records and replace with a temporary label. Interruption—this time it's Mr. Politi, and not in his usual, bland form but in his "Snap-it-up!" "Do-it-now!" "Action!" mood. The Herb Society representatives are here and want the tentative plans for the planting of the Herb Garden—their conference is about to start and it is impossible for them to proceed without it. Seeing the hectic bustle around him, he "snaps-it-up" himself, locates the plans and breezes off with the comment that he hopes for more efficient service next time. In the meantime, the aroid, rose, and label service crews are about finished and are casting side glances at that clock, wondering if those new plants will be well housed for the week-end. No such luck —that phone again! A member of the public has been transferred to Plant Records for information on a source for choice rock garden plants so that she can pick them up and plant them over the weekend. "From Canada, northern New York State, Vermont!!! But I want the name of a nursery in the New York City area, where I can buy them right now and plant them tomorrow and Sunday."

After a brief explanation on the scarcity and apparent lack of demand for such rare plants in this vicinity and that local nurseries do not find it profitable to handle them, she cheerfully accepted the disappointment of not being able to obtain them immediately. She also realized, probably for the first time, that instead of a nurseryman being a grower of all plants from the tropics to the polar regions, he must of necessity offer only those plants which prove best for him to handle. And so Plant Records dampens the spirit of a "plant enthusiast" temporarily, but causes her to appreciate the importance of good plants over the dime-store items.

It is late this Friday afternoon, so the crews are getting back to their respective tasks of checking and going over that new batch of plants to be recorded in the files. At the end of this hour or at the end of any hour of any day, they say "Plants may come and plants may go, but Plant Records goes on forever."

Charles Czarnecki, above, is operating a Roovers embossing machine and Joe Kilz, right, cuts labels on a Hermes engravograph.

Registration Program For Hardy Woody Plants

By J. Franklin Styer

Dr. Styer, of Styer's Nurseries, Concordville, Pennsylvania, is active in many horticultural organizations — among them are the American Association of Botanic Gardens and Arboretums, the American Horticultural Council, the American Association of Nurserymen, the Pennsylvania Horticultural Society.

TWELVE YEARS AGO the American Horticultural Council named its first Commission on Nomenclature, which set forth to rewrite the very brief appendix to the Botanical Code, the only rules then in existence for horticulture. The American situation at that time was marked by much controversy over the somewhat radical principles used in the reference work, STANDARDIZED PLANT NAMES. It appeared desirable to have a more authoritative

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HARDY WOODY PLANTS
That Deserve to be Better Known

By **E. Lowell Kammerer**

In June 1958, Mr. Kammerer, Curator of Collections of the Morton Arboretum, Lisle, Illinois, called to the attention of the Illinois Nurserymen's Association some of the less-known plant material perfectly reliable in that area as to hardiness, adaptability and of definite landscape value and recommended that nurserymen grow some of the more unusual plants along with their regular stock.

The following excerpts are from his talk to the nurserymen during their visit to the Morton Arboretum.

Taxus cuspidata densa is one of the lowest growing, most compact of the Japanese yews. It can be clipped as a hedge to as low as one foot, although it does eventually grow to four. Of the spreading Japanese yews, we are inclined to favor *Taxus media wardi.* This is faster growing than most and can be counted on to stay within a five-foot height limit. Its foliage is very dark green.

Horse-chestnuts have been frowned upon because they are "dirty" trees — they are always dropping something, leaves, withered flowers, husks or the buckeyes. But the double horse-chestnut is different; being sterile, it does not produce seeds. Furthermore, it is more attractive in blossom with florets that are fully double.

Usually it requires thirty years for a gingko to reach fruiting size, too late to correct the situation if the tree turns out to be a pistillate form. The fruit of the latter has a very offensive odor which no one likes. This emphasizes the importance of segregating the sexes and propagating from staminate types.

The flowering crabs 'Dorothea' and 'Katharine' have definite promise because of their attractive blossoms. 'Dorothea,' which originated at the Arnold Arboretum is a dark rose-pink, opening a little lighter, and semi-double; 'Katharine' is a very lovely soft pink, about two inches in diameter. The fruit of the former is yellow; of the latter a dull red.

I also want to mention the Manchurian crab, *Malus baccata mandshurica*, because it is one of the species which never fails to give an excellent blossom display. It blooms here a week or ten days earlier than any of the other crabs and is especially appreciated in off-year seasons. This spring was a scanty-blooming period, but *M. baccata mandshurica* was as floriferous as ever. It is rather deep pink in bud, with flowers opening white. Tall growing, it will reach thirty feet, and as it often spreads as much, it needs plenty of space.

Among the dark-flowered crabs, we still like *M. purpurea lemoinei*; it is not new, but its late, deep tonal blooms attract a great deal of attention.

The 'Crimson Pygmy' barberry, introduced from Holland in 1948, is an excellent low hedge plant, spreading wider than its twenty-four-inch height.

The Korean barberry is grown as a clipped hedge in the Hedge Garden. One of the rust-resistant barberries, it is of value because of its freely produced yellow flowers in drooping clusters, its persistent bright red fruit, and its brilliant fall color. It is perfectly hardy, as is true of most of the Korean introductions.

The 'Bosley' hedging holly, an origination of Paul Bosley of Mentor, Ohio, is showing the most promise of any hedging holly here at the Morton Arboretum, although 'Old Heavy Berry' is also doing well.

The dwarf fragrant viburnum, *Viburnum fragrans nanum*, from W. B. Clark Nursery in San Jose, California, is particularly promising. Its maximum height is supposed to be three feet.

'Bar Harbor' is one of the creeping junipers almost low enough to run a lawn mower over. Its subdued slaty winter color overcomes the objection so many people have to the purplish hues typical of other junipers.

If we had to select among spruces, *Picea omorika* would certainly be our first choice. It is very tall and slender, with flat needles marked by silvery under-surfaces—the latter suggest hemlock. The branches extend upward, with the branchlets drooping gracefully from them. Some of the oldest specimens of the Serbian spruce in the country, trees forty or fifty feet high, are still less than fifteen feet in diameter, which means that this is a good tree to consider when space is a factor. The Serbian spruce is particularly effective in the fruiting stage—the young cones being quite purple. This choice tree is difficult to get—although we did locate some seedlings in an eastern nursery.

With today's low buildings, we are forced to resort to low-growing, compact plants, and the Swiss stone pine, *Pinus cembra*, because of its limited stature and slow growth, has a great deal to offer. Its needles are silvery, not quite as long as those of the white pine, and it has a very dense habit of growth. Later on, the tree tends to round out, but it is many years before it loses its pyramidal symmetry.

Visitors are always surprised to find the Himalayan pine, *Pinus excelsa*, growing at the Morton Arboretum, not expecting it to be hardy here in spite of the fact that in the wild it occurs at altitudes of twelve thousand and five hundred feet. We consider it a very choice pine. *P. excelsa* has very long, drooping needles, very graceful in appearance; the cones, eight or nine inches long, are also very decorative.

One of the neatest species in the entire genus is the Japanese white pine, *Pinus parviflora.* As the tree is very slow growing, it could be used with contemporary buildings without fear of getting out of scale. It is hard to buy, however. The branches extend from the trunk almost horizontally, and the needles are arranged in tufts, giving a Japanesque appearance.

At one time weeping trees were frowned upon, but some of them have a real place in today's landscapes. Often modern structures have flat uninteresting walls or enclosed courts, near or in

which a picturesque tree, such as the weeping white pine, *Pinus strobus pendula*, could be used to excellent advantage. We are really pleased with the way the weeping white pine is developing. We also have the upright form, *fastigiata*, and the dwarf variety, *nana* in the Arboretum.

The upright columnar form of the Scotch pine, *Pinus sylvestris fastigiata,* makes a good accent or interrogation point in landscaping. The tree is rather slow growing and has needles of interesting steel-blue color.

Pinus sylvestris Watereri is better known, perhaps, although it is difficult to obtain in a range of sizes. It will eventually grow to eight or ten feet, maybe a little taller; is compact and bushy, with a neat regular outline. The color of the foliage is not quite as blue as *P.s. fastigiata.*

We like to recommend the bald cypress, *Taxodium distichum*, as a lawn specimen. In spite of the fact that it is an inhabitant of southern swamps, it does remarkably well in this area. It is deciduous, but the summer effect is especially good, as the foliage is light green and fine-textured. In fall, it assumes rather pleasing tan tones. The winter habit does leave a little to be desired, although the color of the bark and branches is not without interest.

Acer Miyabei, one of the Japanese maples from Hokkaido and some of the surrounding islands, has been in cultivation in this country for a long time but is not well known. One of the most effective of the fall-color maples, its three-lobed leaves turn clear golden-yellow. Its habit of growth is rather narrow, with the branches extending outward at acute angles. Miyabei maple, by reason of its slow growth, is well worth knowing — and growing.

The European hornbeam, *Carpinus betulus*, has a number of uses in the landscape. It is not only a good hedge plant, but also a fine screening material because of its persistent leaves. Its fall color is a lovely warm orange, its seed wings are interesting—in short, it is attractive in every way.

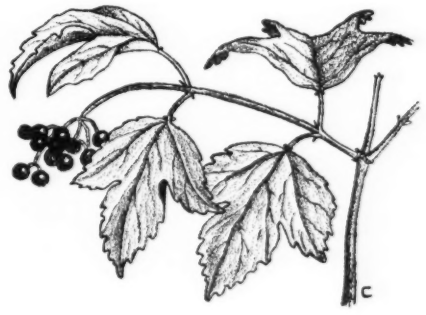
A relative, the native blue beech, *Carpinus caroliniana*, is a fine subject for planting under the shade of taller trees. It is usually a multiple-stemmed plant of picturesque habit, with good summer foliage and excellent fall color. Exposed to sun, it develops a round-headed contour rather than a picturesque form—so its shape depends upon its location.

Another favorite tree is the European alder, a picturesque specimen for landscape work. It is a tree that often occurs as a multiple-stemmed specimen. While the European alder is usually thought of as a hydric plant, it does adapt itself to drier conditions very well. The elongating catkins in March are its major attraction, although the summer foliage is a rich green which remains dark until late fall.

The Katsura, *Cercidiphyllum japonicum*, is an excellent shade or lawn tree that appears perfectly hardy. At least it came through the three severe winters of 1950, 51 and 52 — uninjured. The leaves look very much like those of the redbud, although they are arranged oppositely rather than alternately. They are quite reddish when they unfold in spring, and change to yellow and purplish in the fall.

The whitebud, the white or albino form of the redbud, *Cercis canadensis*, was originated at the Teas Nursery in Carthage, Missouri, and was first disseminated by the Missouri Botanical Garden. It is not quite as vigorous as *C. canadensis*, but is a pleasing variation. The flowers show no sign of pink; even the petioles lack the reddish tinge occasionally evident on the redbud.

A promising new redbud variation is 'Withers Pink Charm.' This is not the usual magenta but rather carmine in bud, opening to a lovely salmon-pink. Dr. Withers, a geneticist of the U.S.D.A. at the Beltsville Station in Maryland, discovered it. While sitting on the terrace of his home in Virginia one evening, he noticed a tree of unusual coloring in the distance. Upon investigation, he considered this variation was worth preserving, so he introduced it, or rather Kingsville Nursery did, as 'Withers Pink Charm.'



Magnolia soulangeana forms are so widely overplanted, that we like to suggest the Yulan magnolia, *M. denudata.* It has tulip-shaped flowers, creamy white and extremely fragrant.

A popular tree at Morton Arboretum is *M. salicifolia*, the anise magnolia. It ordinarily blooms about a week earlier than the star magnolia, *M. stellata*, and has flowers of the same general character. The outstanding difference is the pyramidal habit of *M. salicifolia.* Its leaves, by the way, have a pleasing anise fragrance.

An oak that is difficult to buy is the shingle oak, *Quercus imbricaria.* It is a non-conformist as far as foliage is concerned, in that its leaves have no lobing at all. Entire, dark green and glossy, they look almost like bay-laurel. The habit of growth is very shapely, similar to that of the pin oak. *Q. imbricaria* has been used here to advantage as a hedge plant.

The pyrimidal English oak, *Q. robur fastigiata*, has a great deal of merit. It is considerably narrower than a number of fastigiate trees and certainly more reliable than the Lombardy poplar. Strangely enough, the pyramidal form has shown no injury at all during severe winters, whereas *Q. robur* has suffered. *Q.r. fastigiata* gives a particularly pleasing summer effect.

In areas where one would hesitate to plant *Cornus florida* because of the hardiness factor, the same effect can be had from the pagoda dogwood, *C. alternifolia.* This is perfectly hardy in Illinois and into Wisconsin. It has the same stratified branch structure and while the flowers, admittedly, are not as showy as those of *C. florida*, it does bear in summer very attractive blue fruit on red pedicels. In winter it is difficult to distinguish *C. alternifolia* from *C. florida.*

About a week before *Cornus mas* flowers, *C. officinalis,* the Japanese cornelian-cherry dogwood, makes its very showy yellow display. Earlier blooming and larger flowers in more dense clus-

ters are its major points of difference, although I think it has more character as a bush than does *C. mas*. The branches are inclined to be more horizontal and to present a more picturesque effect in the landscape. The foliage is a glossy dark green in summer.

Of the purple-leaved smoke trees, *Cotinus coggygria rubrifolia* is one of the best performers. It has quite dark leaves, red flowers and a pleasing appearance in midsummer. 'Notcutts Purple' from the Notcutt Nurseries in England and 'Royal Purple,' an even darker form from Grottendorst, are also represented in the Arboretum.

Cotoneaster multiflora calocarpa has never shown any sign of winter killing in the many years it has been growing in the Arboretum. It attains a height of fifteen feet, has good foliage, good flowers, and an extremely fine fruit display. Individual berries are about the size of cranberries. The roundish leaves have a blue-gray cast which adds to its interest, and it shows a naturally arching branch habit of growth.

Euonymus alatus Korean type was recognized by the late Prof. Sargent years ago as being something special. Although it has been in our collection for quite a while, it is only now beginning to attract notice. Korean euonymus is a flatter, more compact growing bush than the other euonymus, and the fall color of the foliage tends more to orange and yellow than to rose-pink. It is also a more prolific fruiting shrub, with very showy red berries. The stems are pronouncedly corky.

The crimson-fruit European euonymus, *E. europaeus atrorubens*, is always admired by visitors in the fall, because of its brilliant capsules. It is a rather tall, free-fruiting bush which develops clear yellow autumn color, to supplement its fine fruit display.

The Japanese *Euonymus semi exsertus* is quite different, not only in growth habit but in the way the leaves droop. The showy pink fruit, borne on long pedicels, is produced abundantly. It is about the same color as *bungeanus*, possibly a little darker. Certainly the bush has a great deal more character.

Witch-hazels are another indispensable group. The variety *brevipetala* of the Chinese witch-hazel, which we got from the Chenault Nurseries in Orleans, France, is the only *Hamamelis mollis* form we have been able to grow to any size here. It has now reached about eight feet in height. Every year in February it produces a lavish floral display. At first we tried planting it in a shaded location, but later learned that sun in the fall enables the wood to mature earlier, thereby increasing its hardiness.

The Ozark witch-hazel, *H. vernalis*, the first shrub to flower at the Morton Arboretum, has blossomed as early as January 25. The flowers open after a few warm days; close when it turns cold, then re-open. In this way, blossoming may last a month or more.

Dwarf Alps honeysuckle, a native of central and southern Europe, is a compact shrub of extremely neat outline with inconspicuous yellow flowers, elongated red fruit, and very good dark green foliage. Botanically, its name is *Lonicera alpigena nana*. Five feet is its ultimate height.

Lonicera maacki podocarpa, a tall honeysuckle valued for its late white flowers borne in pairs and for its translucent red fruit which ripens in late autumn, sometimes remains attractive until the first week in December.

In 1938, seed of the Lebanon buckthorn, *Rhamnus libanotica*, was obtained from the Munden Botanical Garden in Germany, and out of the six seedlings which developed, one showed a tendency to dwarfness. This has been propagated vegetatively. The tallest specimen is still under five feet—a low, compact bush with a future.

Another buckthorn, the Asiatic *Rhamnus pallasi*, looks more like a cotoneaster. Narrow foliage, purplish stems and an extremely fine-textured branch system characterize it. Though also compact in habit, it is taller than *R. libanotica*. The fruit is blue-black as is typical of most of the genus.

The dwarf alpine currant, *Ribes alpinum pumilum*, which came from the Spaeth Nursery in 1938, has remained one of the best low growers in the Arboretum. Roy Nordine has been disseminating propagating material for a number of years, so it should be listed in nursery catalogs before too long. It is a very dainty shrub with fine-textured foliage and jewel-like, bright red fruit. Its habit is extremely dense.

We have *Symphoricarpos chenaulti 'Hancock'* in small sizes only, as this form is of fairly recent introduction. Because of its fine-textured foliage and semi-procumbent branching habit, it may prove a plant of some value for erosion control on banks and slopes.

REGISTRATION PROGRAM (from page 157)

set of rules, firmly founded on the accepted Botanical Code.

Many amendments to the Code were circulated for American approval and then put before the International Botanical Congress at Stockholm, and a set of rules for horticulture was included. The program was steered through all its stages by Dr. Wendell H. Camp, then chairman of the "Committee of Fifty" of the American Society of Taxonomy. With Royal Horticultural Society support, the Horticultural Code was adopted by the Congress and an International Congress for Horticulture suggested. Most active horticulturists are now aware that this Code is in use and that International Horticultural Congresses are being held regularly, and that a governing body has been set up.

This Code recognizes that the active nature of horticultural lists is a special problem, which requires a solution not to be found in the Botanical Code. It authorizes the selection of certain societies to take the responsibility of keeping these lists. The international executive committee has already appointed several such "Registration Authorities."

An Authority works in this way. It is first required to have experience in registering cultivars of the genus with which it is concerned. After appointment as an Authority, it is required to prepare a list of the cultivars of this genus or group then in cultivation. This list becomes the official "starting point" for names in the group, thus eliminating all other old names from further consideration. The Authority then begins to register and publish new cultivars, seeing that they are named in conformity with the Code. This responsibility is international in scope.

The present Commission on Nomenclature of the American Horticultural

Council is actively supporting the American societies which are involved in the new registration program. Its Chairman, George H. M. Lawrence, Director of the Bailey Hortorium, holds the key position in the project as the American representative on the international executive committee.

There are many societies devoted to special plant groups, which, like the American Rose Society, can qualify for and become International Registration Authorities. But there also are plant groups in the perennial and annual field, and the woody plant field as well, which are not served by any society. In the woody plant field especially, it is felt that a registration program should be built up for groups outside the fruits, nuts, roses, hollies and camellias.

For several years the American Association of Nurserymen has been willing to register and publish information on new woody plants of this category and has registered some six hundred cultivars. This was chiefly used by nurserymen, however, and after discussion with several members of the American Association of Botanical Gardens and Arboretums, it was suggested that that body take up this registration program. This was officially agreed upon at the 1958 convention of the Association.

The officers of the American Association of Botanical Gardens and Arboretums, under the leadership of its president, Bernard Harkness, are now making up an outline of registration policy and procedure. This study is of considerable importance, since the woody plant field covers a long list of genera. The task of preparing the base lists for such genera is very great, and these will probably be prepared by several taxonomists from several arboretums. The Association, in collaboration with individual members, already has produced some works of this nature in such groups as the lilacs, maples, crabs.

When the work of registration is begun, we have reason to believe it will be headed by one arboretum for the general secretarial services, and with actual registration carried on there in the less active genera; but in some of the most active the registration may be at separate institutions. The key to this is the expert on the particular plant group; naturally it is desirable to have him involved in this program, wherever he may be. An offer has been made by the Arnold Arboretum to take up the general registration duties for at least two years, as soon as the program is delineated.

The arboretums are not only to be active in registration of new cultivars, but also in evaluation, in testing for climatic reaction, propagation studies, and the like. A survey has already been made by a committee chairmaned by Dr. John Wister, Director of the Arthur Hoyt Scott Horticultural Foundation, which resulted in a tentative list of about thirty arboretums which are prepared to receive and grow new cultivars of various genera. It is planned that this list will be sent to the originators of new plants when registrations are made, and thus testing will be arranged for. The periodic reports on this work may well become the subject of bulletins published by the American Association of Botanical Gardens and Arboretums, and should be of worldwide interest.

MIST PROPAGATION

By Thomas Wheeldon

Excerpts of the talk given by Dr. Wheeldon, of Richmond, Virginia, at the twenty-fifth semi-annual meeting of the Holly Society of America, held in that city, November 1958.

As YOU KNOW, I am an orthopaedic surgeon which means that I work with bones and joints. Naturally, this specialty has as a steady diet the handling of fractures which frequently may be a very difficult chore. Various and sundry pieces of apparatus have been developed for use in the setting of bones. To listen to the men who sell this apparatus, one has merely to apply this machinery to guarantee a perfect reduction. Many times the physician purchases the apparatus only to find that while it will assist in the reduction of the fracture, more skill in handling the appliance is necessary than the actual skillful handling of the bone itself.

I cite this to emphasize the point that I believe the propagator must make a mist system his slave, if he is to profit by his ownership of it. Certainly, to believe blindly that the use of a mist system guarantees results is but to flirt with a myth. Strangely enough, though, practically every article on the subject is likely to exalt the use of mist as a goddess of success without saying that it can be a demon in disguise as well.

I have five propagating houses. Two are 13′ x 50′ saran cloth houses, two are 13′ x 30′ glasshouses and one is an 18′ x 150′ polyethylene film house.

The saran cloth houses, which are of permanent 2″ x 4″ construction, are axially exactly north and south. They are in full sunlight. They are covered with saran cloth which provides thirty-two percent shade. There are five-foot benches on each side with a three-foot aisle in the middle. The benches are one foot from the ground with bottoms of one-half inch hardware cloth. The benches are six inches deep. If plants are to be propagated directly in the benches one inch of coarse rock (creek bottom pebbles of proper analysis preferred) is spread first and over this is spread one inch of filter sand. Three inches of propagating material is spread over this. If the propagation is to take place in flats, the flats are placed directly on the hardware cloth. The nozzles — I use the Florida type — are on upright pipes twenty inches above the top of the propagating medium and five feet apart. The saran cloth which also covers the roof is brought down on the sides of the house as a peplum so that there is a double thickness of cloth on the sides of the house in a band forty inches wide. This puts the center exactly in line with the nozzle and prevents wind drift. With the single thickness of cloth overhead and below the peplum, good turbulence is obtained. By using these specifications saran cloth 6′ wide x 20′ long fills all necessities. There is a door at each end of the houses. I call these my turbulence houses for no good reason other than that there is no obstruction to air currents in any direction.

The two glasshouses are built in excavations three feet deep. The eaves of the glass are just about ground level. The benches are ideally exactly like those in the above described turbulence houses, and the nozzles are placed in exactly the same arrangement. Ventilation is provided through vents at each end.

The polyethylene film house is in a three-foot excavation. It is of permanent construction. The benches are built as in the other houses, but are pro-

vided with bottom heat automatically controlled. From September until April this house is covered with an outside and inside skin of four mil. polyethylene film with a four-inch dead air space between. From April to September the house is covered with thirty-two percent saran shade cloth. There are adequate ventilators and an exhaust fan is at one end.

This somewhat baccalaureate description of the propagating houses has been made because they constitute a series which might be considered most efficient in enabling us to get the most out of our natural climatic conditions and because their varied conditions calls upon control of the mist in a manner that certainly cannot be said to be dull.

Since we are much concerned with the control of temperature and light as well as moisture, a somewhat special system of supplying water is valuable. It goes without saying that the more saturated the air is, the less evaporation takes place and, hence, the less temperature change. In order to accomplish this, right pressures are necessary. The more finely dispersed water is driven from the nozzles, the less interruption of light. Since there is ordinarily no need to cut down on the amount of illumination, we can devote our efforts to control temperature and moisture. To accomplish the former, we vary the water pressure and to accomplish the latter, we vary the periodicity of mist extrusion. The pressure is controlled through a centrifugal pump incorporated directly in the water lines, the pump being rather small, but the motors being very large. In this way, instantaneous response is experienced in starting and stopping the mist. Solenoid valves are synchronized extremely accurately. This outfit may sound and may really be considered complex; but its installation, which resembles an oil fractionating plant, seems very simple to the engineers who designed it and, I am sure, could be duplicated easily from my plans.

The turbulence houses are used for early propagation. We usually start this work with available cuttings of those varieties which are only slightly part green wood and certainly would hardly be called soft wood. Depending on the season, this takes place during the last half of May. If we can get the cuttings stuck by the middle of June, rooting usually is well established by early August. These cuttings, which are in flats, are now moved out and a new batch is made in August. By September, rooting has begun, but slows down perceptibly. Therefore, this second batch of flats is now moved to the glass pot houses—so called—where they never actually become dormant. During September the first batch can be potted or banded and put in frames for winter or put in a temperate house to become nicely developed liners by spring. The second batch can be potted or banded during January and left in the glass-houses where they will pick up root structure and burst out in early spring to become well-developed liners in late spring.

By this time, October has arrived and propagating procedures are moved to the film house, where bottom heat of 70°-75° is available. The cycle is pursued, for by December-January rooting will have begun well. Those cuttings which are well rooted will be potted or banded and the remainder restuck. In March, the process will be repeated; by May we shall know what success the year has brought.

It would appear that this is a fairly efficient method of using equipment and labor. With this organization, selecting material as best suited for periodicity, we have been able to propagate the equivalent of two hundred thousand azaleas and forty-five thousand rhododendrons in a calendar year.

Without discussing the merits of propagating material and hormones, I shall say, for the record that I use a mixture of five parts German peat, three parts filter sand and two parts perlite, or whatever equivalent is available. We use hormones that I deem best suited for the particular material being propagated. We sterilize the propagating benches with a mixture of four tablespoons Captan fifty percent, one teaspoonful Lindane fifty percent emulsified, one gallon of water, to every ten square feet of bench.

We sterilize the cuttings by immersing them in the same solution for a few minutes. I do not allow tobacco in any form in our cutting room nor in any of the propagating houses. All workers must wash their hands thoroughly with hexachlorophene soap before entering any of these houses. The same care is used in handling flats and other equipment. The cuttings are wounded where this is deemed necessary.

Cuttings are taken in early morning and are immediately put in polyethylene bags as taken from the plants. They are taken directly to a mist chamber where they are under constant mist until processed. They are put into polyethylene bags until stuck and are then watered in. Our cutting room, being a concrete chamber, is tight. The door is covered with a polyethylene curtain.

Now comes the mist. It is immediately started, each nozzle being turned on as the cutting sticker covers five linear feet of bench. It is started basically at three seconds every three minutes until standard flats (12″ x 18″ x 3″) of azaleas placed in strategical positions weight twenty-three pounds or become constant. If the weight does not build up to twenty-three pounds, the length of time of extrusion of mist is increased until this weight is reached and then regulated to keep it constant. I have found that this method is very accurate, for it gives a true picture of the volume of water in any given area. Just to set an interval of timing gives no idea of the moisture below the soil surface. I have not been able to depend upon an electronic leaf, for certainly this is truly only surface measurement. I have found that the amount of mist required to keep up this soil water volume is sufficient to control temperature, light and air moisture and the air-water balance seems to be exact. On the contrary, experimental work shows that as the soil water volume increases, the success of rooting (all other things being equal) decreases in a definite ratio so that at forty pounds, where there is an excess of about five quarts of water per flat, unit rooting becomes almost nil. As a further proof of this, it is frequently observed that in such cases where the stems have become devitalized, there will be an attempt at rooting at the soil surface plane where only slightly less water gives the cuttings a little hope that they may survive. It may seem that the pursuance is too tedious. Perhaps it is, but by medical standards it is not, and I do not think you will find it so.

We use flats of azaleas as standards. I do this because I am always propagating some azaleas and can always use extra ones. Just a flat of propagating

(Continued on page 168)

AUSTRALIAN ARAUCARIAS FRUIT IN A FLORIDA GARDEN

By **Hedwig Michel**

Mrs. Michel, a keen student of tropical plant material and a newspaper columnist, returned recently from a visit to several botanical gardens in Germany.

TO VISIT A botanical garden, a zoo, a well-established nursery, or a horticultural collector's private domain is an unsurpassed pleasure for the naturalist. Still more than just visiting is to live in an old garden the year 'round, with its flora and fauna in natural state. There is hardly a dormant season in this part of Florida for most of the vegetation, as signs of life and growth are everpresent.

An unusual combination of a collector's, botanist's and home gardener's paradise was planned many years ago when a physician, Dr. Cyrus R. Teed, founder of the system of Koreshan universology embracing the cellular cosmogony, and his followers came from Chicago to make their home in Estero, Florida. Out of Florida's wilderness they built a thriving community and developed an extensive garden, collecting and planting tropical vegetation from far-away lands.

In its early years the community was provided with plant material by the Bureau of Plant Introduction, U.S.D.A., and by foreign nurseries and growers; in later years, through contact with experiment stations and nurseries in the vicinity, rare shrubs and trees were purchased and added to Florida's native growth. Tropical flowering and fruiting shrubs and trees in number, size and beauty, not to be found in any other private garden we know, are the pride of Koreshan Gardens. Visitors are admitted, without charge, to share the beauty and peace of this sanctuary.

Eucalyptus trees still serve the purpose of giving shade and absorbing surplus water, for which they were planted, as seeds, sixty years ago from their Australian homeland. Citrus trees, mangos, litchis, cashews, sapotas, guavas, Surinam cherries, seagrapes, avocados, Canary Island date palms, queen's palms, coconut palms, the native sabal palms, Washingtonias, heavy clumps of thin bamboo, the large and tall Chinese bamboo, and many other unusual trees compose this tropical panorama viewed from our comfortable vantage point on the wide porch of the old two-story guest house, built at the turn of the century.

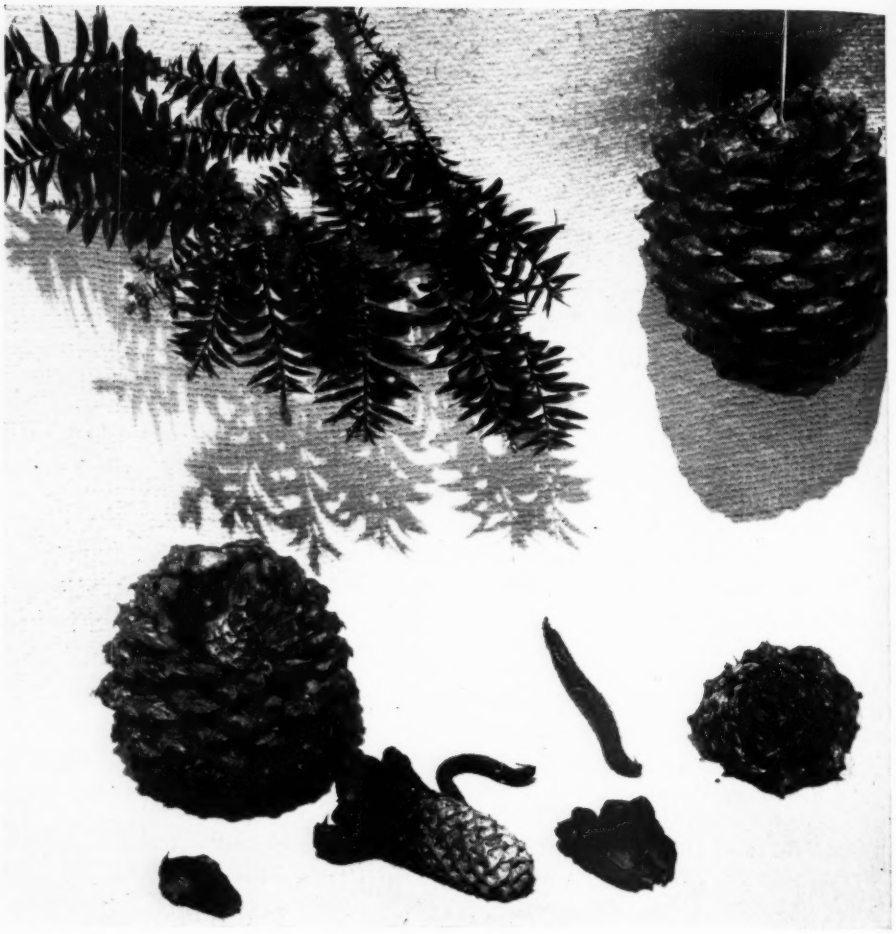
In the distance, towering above its neighbors and silhouetted against the sky is a pine with wide-spreading, symmetrical, horizontal branches. This native of Australia, *Araucaria bidwilli*, is worth a closer view. Walking over to the river's edge, we find two araucarias growing on the high banks of the Estero River. Not always have these two tropical conifers shown their liking for Florida as they do now. Their fully matured, strong trunks, tall and straight, about fifty to sixty feet high, branching heavily from the middle to the top, have less dense and somewhat drooping branches from midway to the ground. The trees now are of the age to bear fruit, after fifty years. And what size and weight this fruit is! The giant cone resembles a huge pineapple—six and a half pounds in weight, with a hundred or more nutty seeds. This cone, hard and scaly, measures nine inches in height, eight inches in diameter, and twenty-five inches in circumference. In addition to this immense cone, the tree produces a finger-like fruit reminding one of the fruit of the cecropia tree, though the araucaria finger is woody. It is said to represent the male seed, while the cone bears the fertile edible nuts.

We first became acquainted with these nuts when they were already expelled from the cone and strewn over the ground. Many were perfect, while others were partly eaten, by the roaming wildlife, no doubt, which are insatiable foragers of anything of food value in their domain. It was almost unbelievable that those scattered pieces could compose such a beautiful giant cone. But one day we were fortunate enough to find a perfect fruit. On the ground, softly embedded in the mulch, nestled a cone, unbruised and with stem long enough to enable us to carry it easily; otherwise it would have been most difficult to handle, as each "scale" is needle sharp, like the branches of the tree. Everything about the araucaria seems to warn "hands off." It is little wonder that a visitor to a Cornwall garden termed this the "monkey-puzzle tree," for even the most courageous little monkey would find it puzzling to get into its branches unscathed.

But there are other puzzles concerning this tree. Where, for instance, are its huge cones concealed? With the greatest of care, circling the tree and using a pair of binoculars to penetrate the thick top and catch a glimpse into the center, we were unable to solve this puzzle. Later, the mystery was solved by a friend who had visited Chile and was familiar with the monkey-puzzle trees there. She contended that only the Chilean *Araucaria araucana* is the real monkey-puzzle tree and informed us that the giant cones are to be found only in the top part of the tree where Nature has provided a thicket of branches to support the heavy fruit. The dense foliage really forms a nest in which the cones rest until they are ripe, when they drop and scatter their seeds.

We were still puzzled how any fruit of the weight we found, six and a half pounds, could fall from the top of tall trees without shattering to pieces. "You were just lucky," our friend said, "and in two ways. If any of your four-legged friends had found it before you did, you would have had to wait another season before you might have found such a perfect fruit on the ground."

More details were learned concerning the homelands of these araucarias and their cultural recognition. In both parts of the world, in South America as well as in Australia, araucarias belong to the food-providing conifers. Their nuts are staple food of the natives. Roasted or broiled, or even fresh, the aborigines favor these chestnut-like kernels to such an extent that different tribes are allocated various sections of araucaria forests, and no other tribe is permitted to enter these restricted areas. Generally, bumper crops are produced



Foliage and cone of monkey-puzzle tree, *Araucaria bidwelli*. Cone at bottom has been separated to show its several parts.

only once in three years; therefore these starchy, fattening, and highly nutritious nuts have to last several years.

In southern Florida different species of araucarias are found, all originating in the regions of Australia and South America. They are not true pines in the botanical sense of the word. They are members of the Coniferae, one of the most important order of forest trees in the economy of civilized man. They are also of great value as ornamentals. Who cannot recall the beauty of a young *Araucaria excelsa*, the dainty Christmas pot plant, the pine for the conservatory, or this bluish green Norfolk Island pine as centerpiece in a well-kept lawn in Florida and other warm climate areas? Also cherished for beauty and fruitfulness is the Brazilian parana pine, *Araucaria augustifolia*. It differs from the monkey-puzzle tree in that the tall trunk has a crown of upturned branches, somewhat resembling an inverted umbrella, windswept in the wrong direction.

Araucarias are of prehistoric age. In the United States their direct ancestors have been found in the famous Petrified Forest in Arizona. Xaraucarias, as they are known, are older than the giant redwood trees.

As prehistoric as the trees is their name, handed down as *Araucaria*. At one time South America was occupied by a strong and heroic race of Indians, the Araucanians. Chile and the adjoining islands and territories were the home of over one million of these Araucanians, and it is said that no other race retained its independence as long as they did. They still live in Chile—in greatly reduced number.

From the Chilean province of Arauca came the forest tree *Araucaria*. On the South American Pacific coast and the islands of the Pacific Ocean these huge and beautiful coniferous forest trees are monuments of longevity. Introduced into Florida, they have acclimatized well and have grown to stately size and shape, not only in the Koreshan Gardens in Estero, but also in Sebring and as far north as Jacksonville.

The Queensland pine of the coastal hills of the Blackall Range and the Bunya Mountains thrives in sheltered valleys, well irrigated by stream and gully and by drainage from the hills. The wood is of a fine texture, of the Kauri type, the commercially valued softwoods of Australia. An experienced traveler and expert on Australian forest trees, E. H. Swain, praised the beauty and qualities of this tree highly in his book, THE TIMBERS AND FOREST PRODUCTS OF QUEENSLAND. HE writes:

(Continued on page 168)

For the first time, and probably due to this summer's heavy rains, twenty-two cones fell unshattered, some four inches into the soft ground. Dr. L. W. Bubbett, President of Koreshan Unity, holds the heaviest weighing thirteen pounds.

IRON DEFICIENCY CHLOROSIS OF SHADE TREES IN EASTERN UNITED STATES

By **Homer L. Jacobs**

Mr. Jacobs is Vice-President, Research and Development, of the Davey Tree Expert Co., Kent, Ohio.

RESEARCH by the Davey Tree Expert Co., begun in 1926, led to the development of successful methods of treating iron deficiency chlorosis of shade trees in eastern United States. The studies and field treatments were reported in THE ARBORICULTURIST, August and September 1936, and reprinted in the 1946 bound volume.

Though prepared for publication over twenty years ago, the information remains generally accurate and authentic. Accumulated experience gained in the passing years emphasizes chiefly the greater prevalence of this deficiency in trees and in areas outside those considered in the original article, and in some shrubs and in some conditions where the soil is more on the acid side of neutrality.

This type of chlorosis has been recognized in various parts of the world for nearly a hundred years. In Europe it has been reported on peach, grape, walnut, pine, fir and other groups of fruit and forest trees. In our western states, iron deficiency has been recognized as a problem of orchard, garden and field crops, as well as of shade and forest trees. Among these may be mentioned such widely separated plants as cowpeas, strawberries, juniper, pine, poplar, eucalyptus and lemon. Both in Europe and in the western part of the United States, the relationship between this disease and the alkalinity or high lime content of the soil has long been known. In fact, its occurrence on calcareous soils is so generally accepted that it has been referred to frequently as lime-induced chlorosis.

The symptoms of iron deficiency chlorosis, as observed under eastern conditions, may be described first as a yellowing of the leaves in the areas farthest removed from the veins. Associated with it are the usual symptoms of starvation. The yellowing may range from a barely visible mottling of the leaves to a lemon-yellow or even a silvery white that is ghostly in appearance. However, as long as any green remains, it will be found along the veins. In the early stages the leaves may be normal in size and yet be definitely yellow. This is particularly true when only a part of the tree suffers from the trouble. In the case of a young, vigorously growing tree the trouble usually shows first as a yellowing of the late spring growth with the early part of the current year's shoot bearing normal colored leaves.

Once this trouble appears, its severity increases from year to year unless treatment is given. A large tree may show it first in one-half or one-third of the top or perhaps in just one branch. The next year a larger portion of the tree may be affected.

One tree may be quite chlorotic and another of the same species, growing only a few feet away, may be normal in color. A small tree usually exhibits about the same degree of yellowness throughout its branches. As the deficiency affects the tree for a longer period, the leaves, from year to year, become smaller and more yellow. Breakdown of the leaf tissue is then likely to occur. This may be found as an irregular blotching of the leaf or as a more regular pattern, similar to that found in leaf scorch due to lack of water. On the larger trees the topmost branches, or the ends of very long limbs lower down, are most likely to be the first to turn yellow. A cluster of leaves may open from the terminal bud and make only a feeble attempt at normal development and appear, by midsummer, as a tuft of partly grown, blanched and ragged leaves with no winter buds set for next year's leaf crop. When this stage is reached, clusters of small reddish leaves sometimes appear from dormant buds along the trunk. This has been observed especially on small trees.

By the time a tree has shown pronounced yellowing over a large part of its foliage for a year or two, the acute symptoms are apparent. Twig growth

Not much green remains along the veins of this silver maple which, as a whole, is blanched in appearance.

is short and dead branches appear. In large old trees, this dying back assumes the usual appearance of staghead. An occasional tree may reach a very evenly chlorotic condition before dying of the branches takes place. One of the most amazing horticultural sights that I have ever seen was a chlorotic wild black cherry thirty inches in diameter and perhaps seventy feet high. This tree stood on a hill and from a distance of half a dozen city blocks appeared as a pillar of lemon-yellow arising from the surrounding normally green landscape. On closer examination not a single green leaf could be found on the tree. Some of the leaves showed a small amount of green along the veins. Many of them were so devoid of chlorophyll that one wondered how they could remain alive. The final stage, preceding the death of a large tree from this cause, presents a remarkable appearance not easily forgotten and not duplicated by any other disease with which I am acquainted.

The relationship between iron deficiency chlorosis and the lime content of the soil has been mentioned. Many pages of technical literature, by a number of writers, have presented the results of investigations concerning this relationship. Different ideas have been advanced to explain just how and why this disease occurs most frequently on soils of this type. In soils of high lime content, the iron of the soil does not completely supply the needs of the plant for this element. This may be due, as some have claimed, to complex reactions within the plant itself.

However, it is more readily explained by the well-known fact that in alkaline solutions many of the iron compounds do not dissolve readily and hence cannot be absorbed by the plant. Such alkalinity may be natural or may be the result of soil treatments.

Suburban areas which have been landscaped and gardened for many years show this type of yellow tree more frequently than do nearby areas of undeveloped woodland. Without minimizing the use of the lime when needed, it should be pointed out that too often it has been used indiscriminately and sometimes without any real knowledge of the needs of the soil or plant.

The side of a large tree nearest a crushed limestone driveway is often chlorotic while the other side, the roots of which are covered with lawn or border planting, remains green. A species ordinarily not affected by this trouble is liable to become chlorotic if planted in a "turn-around," where a large part of the root system is covered by a circular limestone drive. In southern Ohio, the earliest "improved" roads were made by covering the graded earth roads with a layer of crushed limestone. Through many small towns and villages the course of these old limestone "pikes" continues to be marked by a trail of partly chlorotic trees.

Frequent watering, with tap water high in minerals which neutralize soil acidity, also may be responsible for trees becoming deficient in iron. This has been recorded repeatedly in large trees which were normal in color when moved from an acid soil and which required heavy watering. Within two or three years such a tree becomes quite yellow. Tests then show it to be growing in a soil decidedly less acid than that in which it grew before being moved. The degree of acidity of the ball of earth moved with the tree may have changed greatly during this time.

Chlorotic trees may be found growing in soils having a range of textures from sands to clay loam. However, all have the common factor of high lime content or alkalinity. This can be recognized with the aid of a colorimetric hydrogen-ion testing set.

From a number of records of the Davey Tree Research Department and from reports of field men, it is evident that this trouble seldom develops in soils more strongly acid than about pH 6.0. One group of trees in a soil testing 5.8-6.2 near the base was definitely iron deficient as indicated by their response to treatment. However, these were trees which had become chlorotic since they were transplanted with a ball of earth. Presumably this reaction represented more nearly the acidity of the soil in which they had been grown. The soil into which they were transplanted tested 6.6 to 7.4 just outside of the fillback.

At soil reactions ranging from slightly on the acid side of neutrality to definitely alkaline, chlorosis is found frequently. This is particularly true for the more sensitive species. In other words, in a soil ranging from pH 6.0 or 6.5 to 8.0, we can strongly suspect an abnormal yellowing of trees or shrubs to be iron deficiency chlorosis. Of two blocks of American holly in different locations in one nursery, one was chlorotic and the other normal in color. Soil tests in the normal block gave a reaction of pH 5.2 while that in the chlorotic block tested pH 7.4.

Of the several genera and species which suffer from this deficiency, oaks and maples are by far the most susceptible, with oaks being placed at the head of the susceptible list. Although the pin oak and white oak are perhaps most frequently observed to be chlorotic, there seems to be little difference in susceptibility among several species, where they occur in about equal numbers, in a soil in which chlorosis is common.

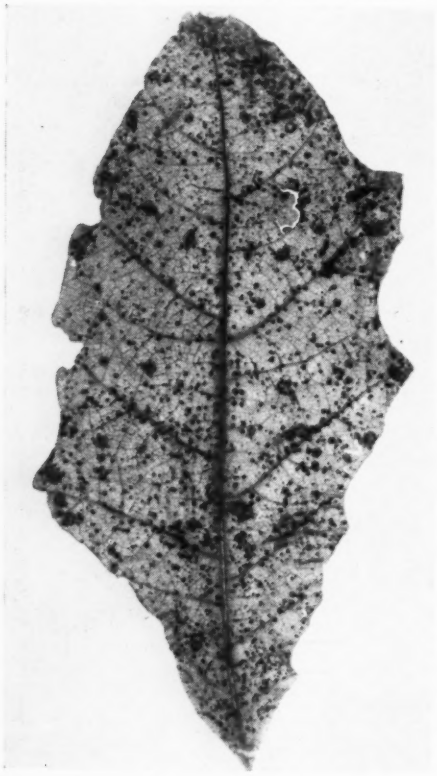
A list might be made which, with few exceptions, would be based on the response of the trees to treatment as indicated later in this article, as well as to occurrence of the common symptoms. Such a list would include the following: Pin oak, common red oak, black oak, swamp white oak, white oak, willow oak, mossycup oak, yellow birch, canoe birch, wild black cherry, Mazzard cherry, red maple, silver maple, sugar maple, sweet gum, flowering dogwood, American elm, American holly and white pine. English elm, horse-chestnut and Norway maple have been reported, but I would not include them in the definitely chlorotic list without further confirming records.

Since lime-induced chlorosis is frequently reported on conifers in the western United States and other parts of the world, it seems likely that others may be added to the white pine included in the eastern list given above.

Following the century-old recogni-

In these white oak leaves is evidence of the advanced stage of iron deficiency chlorosis.

The final stage of chlorosis of an oak leaf—living parts are very yellow almost to the veins, and there is serious breakdown of the tissues over a large part of the leaf.



tion of lime-induced chlorosis as an iron deficiency disease, several methods have been reported to be more or less successful in supplying trees with this element. Among these may be mentioned the application of iron salts to trees by spraying them while dormant or in leaf with a solution of iron salts, adding iron salts to the soil, injecting iron solutions into the trunk and acidifying the soil. The purpose of acidifying the soil is an attempt to bring the natural iron of the soil back into solution by reducing the alkalinity responsible for its insolubility. We have used all four of these methods either in experimental plots or in the field, but only two of these methods have given results that warrant their use in the care of large shade trees. However, it may be well to cover them rather briefly in order to make the record complete.

Sprays containing from a fraction of one percent to forty percent iron salts have been used by investigators in various parts of the world. The forty percent solution gave results when applied to peach trees during the dormant season. The weaker solutions have usually caused some improvement when used as foliage sprays. In other cases spraying has given no results, although application by other methods has definitely proved the trouble to be due to iron deficiency.

In experiments with pin oaks, it was possible to improve color on chlorotic leaves by spraying. This improvement was irregular, the green being confined to the spots where the drops of spray solution dried on the glossy surfaces of the leaves. Leaves which came out following the treatment showed little if any benefit. This is in keeping with the experience of western workers with conifers, who found it necessary to spray conifer seedlings at ten-day intervals to control chlorosis throughout the entire season's growth. While this method could hardly be recommended for large shade trees, it might be recommended for trial on shrubbery or other garden plants suspected of being iron deficient. Where tap waters are high in minerals which cause alkalinity, it may be difficult to get a good solution of the iron salts commonly used for this purpose.

Some fourteen or fifteen years ago, Dr. L. C. Chadwick, of the Department of Horticulture at Ohio State University, developed a method of control by treating the soil with a mixture, in equal parts, of iron sulfate (ferrous sulfate), finely ground sulfur, aluminum sulfate, and ammonium sulfate. This material is mixed with the soil, or applied in punch bar or drill holes early in the spring or as soon as symptoms are detected in late spring or summer, at the rate of two and a half to three pounds per inch in diameter of the tree trunk—the heavier application for trees over six inches in trunk diameter and on highly alkaline soils.

The addition of soluble iron salts to the soil has been without consistent results. The complex nature of the soil probably accounts for the conflicting results secured by this method. In general it may be supposed that these alkaline soils, in which the iron already present is insoluble, will also soon tie up the added iron.

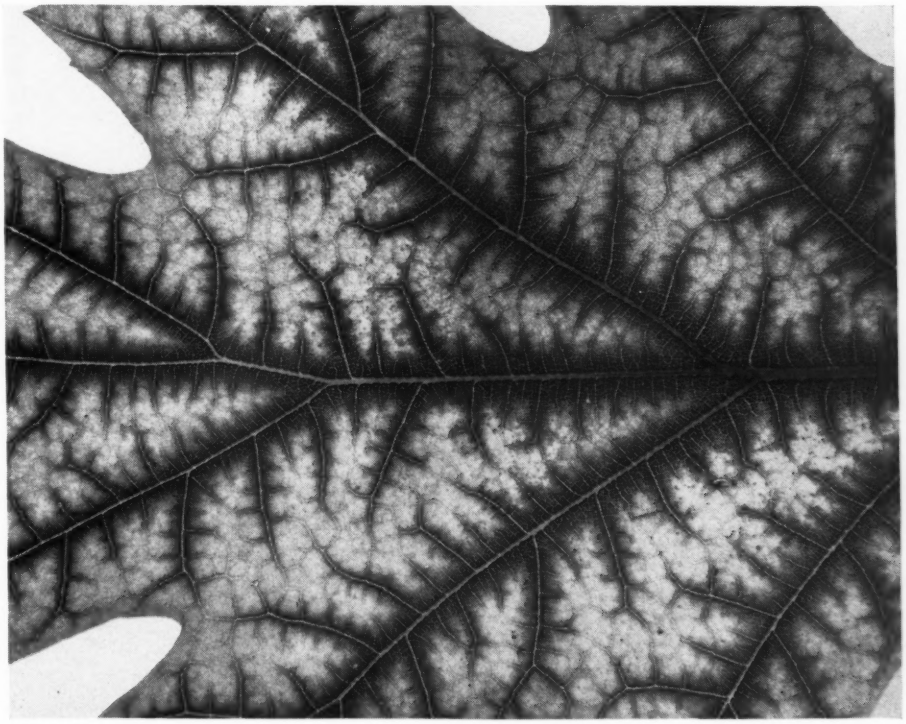
The greatest benefit has been reported from this method when iron salts have been applied in a trench, or in drill holes, and when a comparatively large amount of material has been used. In such cases the iron salts themselves set up a temporary acidifying effect on the surrounding soil which may aid the roots to secure the necessary iron in a soluble or available form.

In our experiments large quantities of iron salts spaded into the soil, both with and without additional acidifying agents being applied at the same time, have been of no benefit.

Beneficial results have been reported, from Ohio and Texas, by applying both iron salts and acidifying materials together in perforation holes. Both reports result from the application of this method to a limited number of trees. Whether it will be successful in a wide range of soils and chlorotic species is a problem for further research.

Most investigators who have worked with iron deficiency chlorosis in fruit trees have attempted to cure the disease by injecting either dry iron salts or solutions of iron into the trunks. When dry materials are injected, they must be dissolved by the sap before being transported to the leaves. The injection method in the hands of a number of workers in Europe and the western United States has given more uniformly good results than any of the other methods which have just been discussed. This is true regardless of the fact that injury to the bark, sapwood or leaves sometimes occurred and that recovery was not complete, due to irregular distribution of the iron throughout the tree.

Early in the course of our experi-



A leaf collected from a chlorotic red oak in Detroit, Michigan, illustrates the standard symptom of iron deficiency chlorosis — a yellow leaf with green areas along the veins.

ments with this disease, it became apparent that the injection method offered the most logical approach to the problem, since we found it would be necessary to treat large trees of several species growing in a wide variety of soils and under a considerable range of climatic conditions. It then became necessary to devise methods of injection suitable for use under the conditions of commercial shade tree care. A summary of the results of six years of treatment of more than two hundred trees per year is of interest. These trees have varied in size from one and one-half inches in diameter to about fifty inches in diameter.

Where a tree has been just chlorotic enough to show a mottled pale green effect, the first result of treatment is that the veins are less noticeable, when viewed from beneath, than before the treatment and the tree, as a whole, presents a richer green appearance. Lemon-yellow leaves return to almost normal color and a tree so chlorotic that it stands out like a pillar of yellow seems to subside into the surrounding green landscape. The tree so iron deficient that the leaves are small and spotted, and with half-grown tufts of terminal leaves, undergoes a remarkable change. The living but yellow tissues in the older brown-spotted leaves come back to normal green. The terminal buds open and produce clusters of leaves of good color which are much larger than those formed earlier in the season. On small trees the new growth produced in this way may result in a much thicker, more luxuriant foliage cover before the end of the growing season. Where all of the leaves were breaking down previous to treatment, these may fall and be entirely replaced with new leaves.

Very large old trees which bear pruning wounds, trunk scars and a partially destroyed root system, which result in a disturbed sap-conducting system, respond less evenly to injection treatment; and follow-up treatments, based on the response of the individual tree, may be necessary. Trees with a wood structure which permits rapid absorption of the solution green up evenly throughout. Those which take the liquid slowly recover in an irregular manner. An eighteen-inch pin oak evenly yellow throughout may recover completely as a result of one treatment, while a white oak of similar size may remain yellow in certain branches until such branches are individually treated.

It is a conservative estimate to state that seventy-five to ninety percent of the injected trees show definite benefit from the treatment. Those that are not benefited may, in some cases, at least, be accounted for by incorrect diagnosis. It is possible that the yellowish green color resulting from nitrogen shortage is sometimes mistaken for iron deficiency. It may be, too, that an occasional tree is suffering not from iron deficiency chlorosis, but from a lack of manganese, zinc or one of the other minor elements which modern research has shown to cause similar diseases of pecan, tung oil trees and citrus trees in the southern states.

An occasional small amount of dieback around the point of injection is followed by normal callus that soon covers the hole, which is plugged with metal screw plugs at the completion of the treatment. Some scorching of the leaves may occur following injection during extremely hot or dry weather or during the period of most rapid tender growth in late spring or early summer. This, however, seldom results in more than the dropping of a few scorched leaves which is soon followed by the production of new non-chlorotic leaves.

Seven or eight years ago, a new type of compound for treating iron deficiency chlorosis became available. This is iron chelate, or chelated iron, which has the property of remaining soluble longer than other forms of iron and for this reason has proved to be reasonably successful when broadcast over the surface of the soil. It is marketed under several trade names, for instance, "Nafe," "Sequestrene 330," "Ferro Green," "Perma Green Iron 35," "Versenol," and was developed for chlorosis of citrus fruit trees on the acid soils of Florida.

With the injection and soil methods, many thousands of trees have been treated with generally worthwhile results. We now also employ the broadcast method of chelated iron and in the past six years have successfully treated several hundred trees with chelated iron in states as widely separated as New York and Wisconsin, Michigan and Texas. In fact, surveys conducted by our Technical Center indicate that the iron sulfate, aluminum sulfate, ammonium sulfate and sulfur mixture is being replaced by iron chelate.

The importance of thorough distribution of chelated iron throughout the root area cannot be overemphasized. This means that the determined dosage should be thoroughly mixed with tree food and distributed in drill holes not more than a foot apart throughout the feeding area of the tree. When no fertilizer is being used, the iron compound should be well mixed with sand so that the small amount of the chemical will be evenly distributed in a large number of holes.

Permanent results cannot be expected from any chlorosis treatment—injection, soil or spray. It may be necessary to repeat treatment each year or two to keep trees supplied with iron and in good growing condition.

MIST PROPAGATION (from page 162)

material, properly evaluated, would work, but I hate to see those square feet of propagating space go to waste.

We have propagated holly during every month of the year.

As to our results—pride goeth before a fall. We shall have our fall, but for the past three years, that being the duration of time that I have had this complete set-up, our over-all average has been better than 95%.

AUSTRALIAN ARAUCARIAS (from page 164)

"The Bunya Pine (*Araucaria Bidwillii*) is a heavy stout tree, with a crown resembling, in outline, a Gothic arch or beehive, commencing at half the total height of the tree, and built up of ropy limbs, radiating horizontally in bewildering multiplicity, from the hub of the bole, like the spokes of a wheel, yet conveying the impression, as you look upwards, of the complex cordage of a ship's rigging. The glossy dark green foliage which consists of mid-ribbed inch-long 'tusks,' arrayed in crowded spires, is carried in great tufts at the end of the branches, covering the outline of the crown and crowding densely towards the top to form a nest. In this nest the football-like cones develop which yield the Bunya nuts.

"The bole is covered to a depth of two, three, and sometimes four, inches with a pithy-corky bark, the surface of which is fawn-colored and roughened like a nutmeg grater with pustular de-

velopments. In this bark the aborigines were wont to cut footholds when climbing the tree to secure the nut-filled cones before they fell to the waiting wallabies (Australia's different sized kangaroos)."

The excellent condition of the Australian araucarias in the Koreshan Gardens is due to the ideal location on the banks of the Estero River, where it makes one of its picturesque bends.

Turning back into the grounds, we follow the path along the ravine that winds through the gardens. Here, in jungle-like abundance, ferns, palms, azaleas, hibiscus, agaves, sansevierias, coonties and other vegetation thrive, shaded by old oak and camphor trees, mangoes and bauhinias. Overhead is an entrancing air garden of orchids, tillandsias and bromeliads.

This is a real garden, unspoiled, "an unwritten romance and not a mere arrangement of earth, water, stones and plants." It is the work of Nature, helped by those who love their home grounds.

PEERING INTO THE FUTURE (from page 154)

we know it elsewhere seems inevitable. On the planets of our own little solar system there may possibly be some life on Mars, and it apparently has not evolved so far as it has on earth. On more distant and unknown planets, in our own or other galaxies, life may have progressed as far, or even farther. If at times we may feel discouraged with our limited accomplishments on earth, there is the strong possibility that other worlds may have done better.

As yet it has not been possible to induce major evolutionary changes in living organisms. No one has been able to change a buttercup into a rose, or a cherry into a pea, although these genera are not distantly related. But in addition to more obvious structural differences between these and similar forms, there are also biochemical and biophysical differences — differences in the energy relationships of the components within the cells. Until these are more fully worked out, it will not be possible to induce major evolutionary changes. When they are understood, progressive evolutionary modifications may well be achieved. Perhaps the horticulturists of the future, who establish the great garden in all of the central part of North America, will be using plants of higher evolutionary types than the orchids, the mints, the snapdragons, the asters and the goldenrods that we consider the most advanced to have evolved to this day.

Lest some of you may be disturbed at these thoughts from a religious standpoint, I have discussed them with the theologians, and they do not seem particularly concerned. The universe is far more vast than was supposed; in some ways it has greater uniformity than was previously conceived; in other ways it is much more complex. God in His heaven has infinitely more to do than was formerly thought. He is probably not on a thirty-five-hour week.

In summary, it is possible to evaluate the important part that horticulture has played in the past, and the even more significant role that may be reserved for it in the future. Vital changes in the lives of men and women have been effected by improved systems of transportation and of communication; but these will be trivial compared with the transformation wrought in our social and economic organization when energy is stored directly in foods. And finally, you are entitled to conceive of yourself as a spirit, off in space since the beginning of time, watching the universe develop, and seeing life unfold on a little planet revolving around an insignificant star, and comparing this with what is happening elsewhere in the universe, and with what the future holds.

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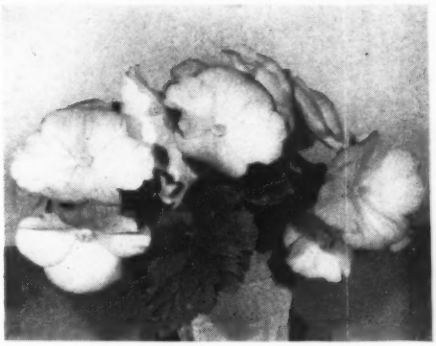


Begonia hiemalis 'Etiquette'

BEGONIA HIEMALIS

By Joy Logee Martin

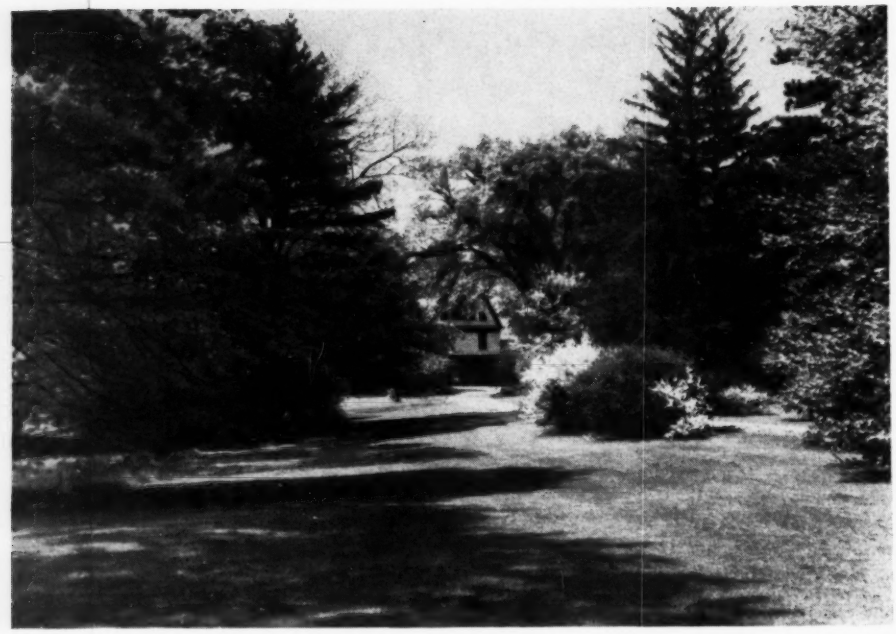
Joy Logee Martin has been lecturing to garden clubs for twenty years, contributes to horticultural publications and is now at work on the manuscript of a book on begonias in which she and members of her family have long been interested. Her brother, the late Ernest Kimball Logee, a former member of The New York Botanical Garden, originated the double dark-leaved semperflorens begonias, some twenty cultivars, named for the "Mother Goose" series.

An eminent horticulturist once stated that *Begonia hiemalis* is the "Queen of all Begonias." *Hiemalis,* which means winterly, was given to this group of begonias by Karl Fotsch in 1933 and was printed in his "Die Begonian." They are hybrids of the winter-flowering *B. socotrana,* discovered in 1880 by Prof. Isaac Bailey Balfour, among bare rocks on the Island of Socotra in the Indian Ocean. It is the only species developing such bulbils.

The first hybrid was originated by John B. Heal of James Veitch & Sons in England in 1883, by using *B. incarnata* as the other parent. Later other hybridists, both in England and Holland, used the Andean tuberous-rooted begonias to secure the large double forms of some of our finest hiemalis cultivars.

They have been known in America as the English or winter-flowering begonias, and magnificent specimens have been exhibited at all the outstanding autumn flower shows in the East. These plants were primarily grown in private estate greenhouses, where their culture was a secret that only the old-time experienced gardeners understood. For several years we have been growing

(Continued on page 172)



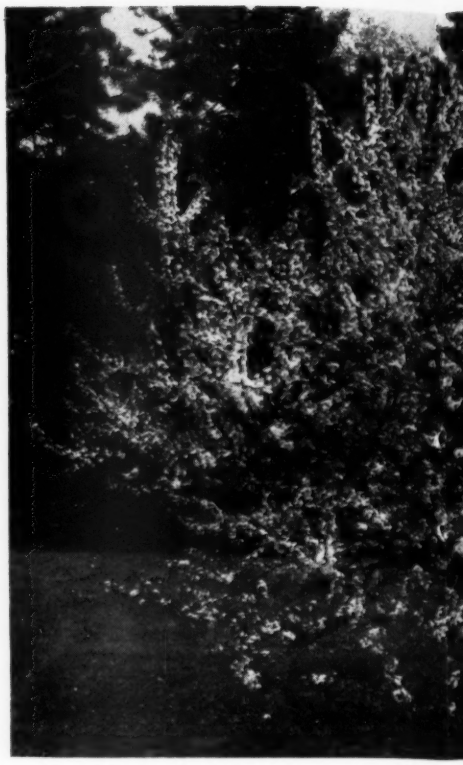
Lawn scene along main drive, north of the home of the Honorable Mr. and Mrs. Thomas C. Desmond at Desmond Arboretum, near Newburgh, New York.

THE Honorable and Mrs. Thomas C. Desmond purchased their beautiful property, two miles north of Newburgh, New York, twenty-nine years ago. They selected it for several special reasons. It is near the boyhood home of Senator Desmond; it commands a magnificent view of nearly ten miles down the Highlands-of-the-Hudson, with West Point visible in the distance; and it has some of the finest trees to be seen anywhere in the United States.

"Krans Kop," the Hudson Valley Dutch for hilltop and the former name of what is now Desmond Arboretum, is made up of two old estates landscaped many years ago by Andrew Jackson Downing. Mr. Downing, who was among the foremost of early American landscape architects, planted many of the trees that are now towering specimens — Norway spruce, Austrian and Scotch pine, Canadian larch, Oriental plane, and European beech.

There are many large and remark-

This is a portion of the special acid soil bed in Desmond Arboretum.



Hortulan plum, *Prunus hortulana*, in

DESMOND A

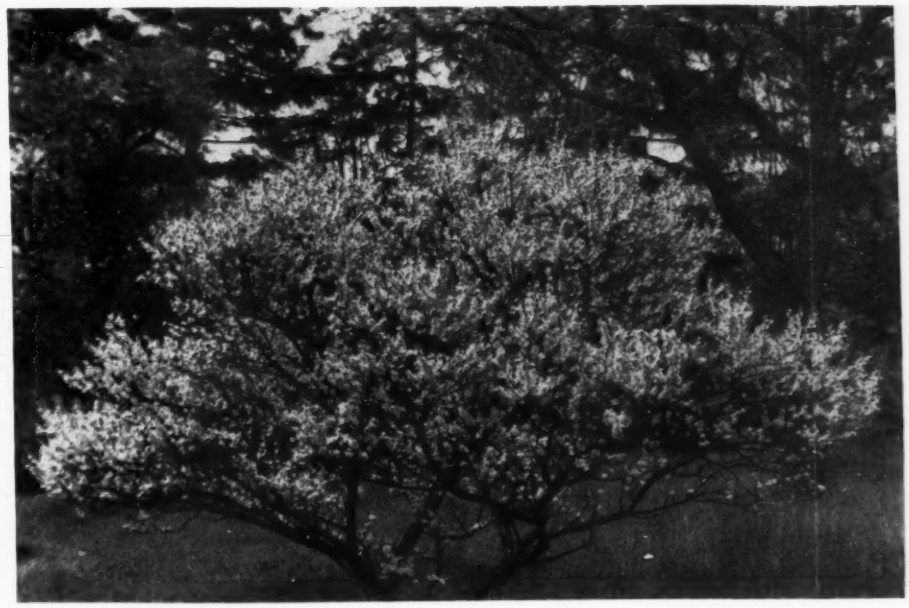
By Dorothy E

Mr. and Mrs. Desmond stand before a beautiful sugar maple, *Acer saccharum*, in Desmond Arboretum.

lana, in flower in Desmond Arboretum.

ARBORETUM

thy Ebel Hansell



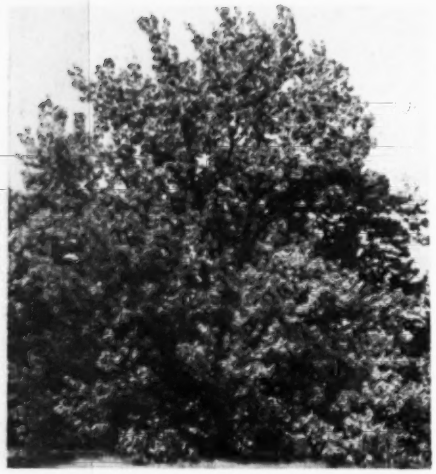
Beach plum, *Prunus maritima*, in flower in Desmond Arboretum.

ably fine specimens, including the sugar maple (*Acer saccharum*), English Oak (*Quercus robur*), the gingko (*Gingko biloba*), and the American elm (*Ulmus americana*). It was, indeed, a treat to see the very tall, vase-shaped elms which are disappearing from the American landscape because of the dread Dutch elm disease. Great care is exercised in the Desmond Arboretum to safeguard these elms; they are fed and sprayed regularly, and dead wood removed, to keep them in a healthy condition.

A specimen of the cucumber-tree (*Magnolia acuminata*) is considered to be the best representative of this species in this country. Another out-standing specimen is that of *Tsuga canadensis sargenti*, which stands close to the residence. It is said to be one of the original trees found on the Fishkill Mountains between 1860-65 by General Joseph Howland. It is named after Henry Winthrop Sargent of Beacon, New York, a great lover of trees and a friend of General Howland, and not after Prof. Charles Sargent of Arnold Arboretum fame.

Sweetbay magnolia, *Magnolia virginiana*, in flower in Desmond Arboretum.

Carolina silverbell, *Halesia caroliniana*, in flower in Desmond Arboretum.



The cucumber tree, *Magnolia acuminata*, in Desmond Arboretum.

The Senator's and Mrs. Desmond's original property purchase was about forty-five acres of slopes and moist bottomlands, to which they have since added another five acres or so. One of the three previous owners was Forsythe Wickes, great-grandfather of Mrs. John E. Parsons, Chairman of the Advisory Council of The New York Botanical Garden.

During the past twenty years, the Desmonds have planted many trees and shrubs and woody vines. Today, there are over four thousand, in eight hundred and seventy-four different species as follows:

222 native American tree species
246 native American shrub species
24 native American vine species
151 foreign tree species
182 foreign shrub species
49 foreign vine species

The Senator's primary interest, however, is to have at least two, and sometimes four or more, species of the native American trees, shrubs and vines that will thrive in the Newburgh area.

Plant material has been brought to the Arboretum from as far as California, Florida, and Canada. Whenever it is possible, large specimens, balled and burlapped, are transported by railway express or by truck to assure their survival; and they are carefully planted as to their requirements—their particular preferences for sun or shade, soil, and so on — and with due regard for landscape effect.

Four choice specimens of the giant sequoia (*Sequoia gigantea*) were shipped by railway express from California in June 1943. They established themselves and three are thriving; one was lost during this past very severe winter.

With so many trees brought in from far as well as nearby nurseries, the percentage of transplanting failure is very low—less than two percent in the past nine years. This is largely due to the consideration given in advance to the location of each new specimen and to the written instructions furnished to the employees engaged in the transplanting operations, even to those who dig the holes. Rudolph Nocker, the forester, has a deep affection for and appreciation of the plants under his care at the Desmond Arboretum.

Mr. and Mrs. Desmond have won laurels in their careers. Mr. Desmond has been prominent in the field of engineering and in government—he served as a member of the New York State Senate from 1930-1958. Mrs. Desmond is the well-known Alice Curtis Desmond, author and painter, and their home reflects her artistic talents.

In their library are letters to members of their family from Presidents Jefferson, Jackson, Van Buren, Theodore Roosevelt, Hoover, F. D. Roosevelt, Truman and Eisenhower and from Mrs. Theodore Roosevelt, Mrs. Eleanor Roosevelt, Mrs. Coolidge, Mrs. Truman and Mrs. Eisenhower. It was "Teddy" Roosevelt, in fact, who started the Senator, when a young man of twenty-nine, on the path that led to his successful career.

A young specimen of *Sequoia gigantea* in Desmond Arboretum.

The Desmond Arboretum has been awarded the silver medal of The Federated Garden Clubs of New York State, Inc. and the gold medal of the Massachusetts Horticultural Society. It is open to the public without charge on weekdays from 10 A.M. to 4 P.M.

BEGONIA HIEMALIS (from page 169)

these glowing treasures among begonias and have proved they are of relatively easy culture, if one pays attention to their simple requirements and background.

Rooting stock from a leaf in the fall has been discarded in favor of stem cuttings taken when the plants start active growth in the spring. Cuttings are taken with two or three leaves from top growth and placed in a mixture of peat and sand, with bottom heat at 65° to 70°. Rooted in about three to four weeks, they are then potted in a light friable soil, a mixture of one third each of soil, compost and sharp sand with the addition of a three-inch pot of organic plant food to each bushel of soil. Coarse charcoal added to this mixture provides drainage and helps to "sweeten" the soil.

The first potting is into two and a quarter-inch pots; the base of the stem with roots must be close to the surface of the soil, which should be lightly packed. Begonias do not thrive in hard-packed soil.

After potting the plants are placed in the shade for about a week, then moved to a well-lighted window. They are watered immediately after potting and then not again until the top soil is slightly dry. The plants should never be allowed to dry out, nor should they at any time be standing in water. Good drainage is very important, and little crushed broken pieces of pots in the bottom of each pot is helpful in supplying this drainage.

As soon as the roots are plentiful in the bottom of the pot, it is time to repot. It is better to repot often, using only one inch larger pot, than to overpot a small plant. When the plants have reached the four-or five-inch pot, they can be pinched by taking out the top two or three leaves. This is done only until the middle of August. More flow-

(Continued on page 178)

A Country Housewife's Garden

By **Gertrude B. Foster**

Mrs. Foster is Editor of
THE HERB GROWER MAGAZINE

WHEN WE FIRST MOVED to the country, it seemed unthinkable to leave the garden long enough to take a vacation. But when an opportunity came to give our children a week of salt-water bathing, I had to resign myself to missing the first flowering of a few plants each summer. We go to Cape Cod at the end of June, so I generally miss the opening of the madonna lilies. Last year there were two hundred and forty trumpets upon a dozen plants when I returned from the seaside. Apparently they like our limestone valley. Unfortunately I was lavish with breaking up the big clumps in the fall and will probably never see such a sight again upon so few plants. Also, I ignored the warnings to keep manure away from madonnas, and in encouraging the lavender plants in the same bed I discouraged the lilies.

In discovering the Cape I gained a natural garden that is much larger in scope and more lush in growth than anything I imagined possible along the coast. It is an herb garden too, for many of the plants that grow in such profusion are both fragrant and useful. I am not referring to the lovely dooryard plantings or the handsome estate gardens which abound upon the Narrow Land. They are filled with roses and flowers in such brilliant colors and fine form that hardly can be matched inland. Nor do I mean the herb gardens which can boast rosemary plants left outdoors the year round and more than a yard-wide santolinas, such as those at the Crossroads Herbary at Orleans.

My garden at the Cape extends from the wholly unplanned and unplanted clumps of clove pinks growing in the sand around the cottage to the patch of coreopsis flourishing by the town landing road next to it, down the sand bank to the beach which is topped by bits of orange milkweed. It includes every roadside that has been unscraped by bull-dozer where wild roses spread their single pink blossoms on warm tar almost under the car's wheels. It stretches over the drumlins mantled with the handsomest of all groundcovers, the shining bearberry, *Arctostaphylos uva-ursi,* from Wellfleet to North Truro, and it encircles the blue fresh-water ponds with azaleas and arbutus growing right down to the water's edge. It throws a necklace of green around the coves where eel grass and sea-lavender edge the tidal flats, and it clothes the high dunes with silver brooches of beach wormwood.

Botanists have studied its bogs and pine barrens, writers have praised the Cape's beauty, and artists have painted it in every light, but I am sure none has delighted in this natural herb garden any more than I. Yet I have never seen a book on the plants of Cape Cod. Somewhere there must be a complete botanical list, though, perhaps none of these plants is limited to the area beyond the Canal but can be found elsewhere along the eastern seaboard. Bay State Nursery, North Abington, Massachusetts, has a special catalog of seaside plants, including bearberry.

It is true that I have seen bayberry growing wild in Litchfield County, Connecticut, and beach plums at Cape May, New Jersey, but I doubt that there is any other small area of land so covered with fragrant plants in such variety. Apparently the Provincetown end of the Cape is greener now than it was a hundred years ago. Thoreau in his famous book, CAPE COD, has much to say about the plateau of pure sand in Wellfleet, which he calls, "the Table Lands of Eastham, stretching from the southern boundary of the town, without a particle of vegetation, almost as level as a table, for two or three miles, or as far as the eye could reach; rising slightly towards the ocean, then stooping to the beach. . . . In short, we were traversing a desert, with the view of an autumnal landscape of extraordinary brilliancy, a sort of Promised Land, on the one hand, and the ocean on the other. Yet, though the prospect was so extensive, and the country for the most part destitute of trees, a house was rarely visible,—we never saw one from the beach, and the solitude was that of the ocean and the desert combined."

Almost a hundred years after he wrote those words the tops of the bluffs along the "back shore" in Eastham and Wellfleet are quite green with bearberry, bayberry and beach grasses. The only bare dunes are found near Provincetown. Perhaps that is why it seems inconceivable that the Pilgrims could have been starving that first hard winter until they found the cache of Indian corn in what is now North Truro. Of course, they may not have known the uses to which the Indians put the sweet fern, the bearberry leaves and other indigenous herbs. Thoreau has a word to say about bayberries, though he is quoting an earlier writer, Robert Beverly, in his HISTORY OF VIRGINIA, published in 1705:—

"at the mouth of their rivers, and all along upon the sea and by, and near many of their creeks and swamps, grows the myrtle, bearing a berry, of which they make a hard, brittle wax, of a curious green color, which by refining becomes almost transparent. Of this they make candles, which are never greasy to the touch nor melt with lying in the hottest weather; neither does the snuff of these ever offend the smell, like that of a tallow candle; but, instead of being disagreeable, if an accident puts the candle out, it yields a pleasant fragrancy to all that are in the room; insomuch that nice people often put them out on purpose to have the incense of the expiring snuff. The melting of these berries is said to have been first found out by a surgeon in New England, who performed wonderful things with a salve made of them."

Ever the experimenter Thoreau tried making some candles himself:—"I have since made some tallow myself. Holding a basket beneath the bare twigs in April, I rubbed them together between my hands and thus gathered about a quart in twenty minutes, to which were added enough to make three pints, and I might have gathered them much faster with a suitable rake and a large shallow basket. They have little prominences like those of an orange all creased in tallow, which also fills the

interstices down to the stone. The oily part rose to the top, making it look like a savory black broth, which smelled much like balm or other herb tea.

"You let it cool, then skim off the tallow from the surface, melt this again and strain it. I got about a quarter of a pound weight from my three pints, and more yet remained within the berries. A small portion cooled in the form of small flattish hemispheres, like crystallizations, the size of a kernel of corn (nuggets I called them as I picked them out from amid the berries). Loudon says, that 'cultivated trees are said to yield more wax than those that are found wild.' If you get any pitch on your hands in the pinewoods you have only to rub some of these berries between your hands to start it off."

Thoreau's Cape Cod and my Cape Cod are quite different, you would say, but the green cover has increased even as the houses and roads have increased. The former will protect the sand spit that is the Cape from erosion from wind, but it will take a great deal to conserve the wild areas from the ravages of road building and commercialization. The people of the Cape are discussing a proposed National Seashore Area, which would make most of Wellfleet, Truro and Provincetown from ocean to bay a National Park. There are valid arguments on both sides of the question. We wish the towns could act quickly to effect stringent regulations on building and set aside some of their wilderness areas for sanctuaries to forestall a National Park. But it would be hard for local officials to find land that would not be controversial, if it were to be taken by eminent domain. We only hope that if the area becomes a Park, it is not so "improved" for tent sites and natural trails that the lovely tangles of herbs and roses will be unable to survive the protection.

Autumn is another off-season time at Cape Cod, when the whole land turns to a colored garden of rich brown of oak leaves, deep garnet cranberry bogs, and richly jeweled blanketing of bearberry with its scarlet fruits in brilliant contrast to the glossy dark green leaves.

When the berries of *Arctostaphylos uva-ursi* are red is the time to collect the smooth leaves for tea. They are cut rather than broken off the trailing plants, for this member of the Arbutus family roots down deeply in spots and then sends out long stems of great toughness defying snapping off. The leathery leaves dry quickly if placed in a brown paper bag in a dry place. They make a pleasant, soothing tea made more delicious by the admixture of wild bayberry leaves, used by the Pilgrims in place of bay leaves of Europe. Bearberry is a specific for restoring health to the bladder.

A few other Cape Cod wild plants of herbal value are:

Broom, *Genista tinctoria*, also called woad waxen. Brought by the colonists for a source of yellow dye made from all parts of the plant. When combined with woad, the flowering tops give a green color which can be fixed with alum, cream of tartar and sulphate of lime.

Orange milkweed, *Asclepias tuberosa*, also called pleurisy root. It is an old-time remedy for respiratory infections, being taken as a tea made from the dried tubers.

Sweet fern, *Myrica asplenifolia*, kin to bayberry and pungent-leaved. In local lore it is a remedy for poison ivy irritation. In Sweden, the bark of sweet gale, *Myrica gale*, is made into an infusion to kill insects and cure itches.

Sea-lavender, *Limonium carolinianum*, also called marsh-rosemary, though why I cannot imagine. The statice-like flowers dry beautifully for winter arrangements. An old-time remedy for dysentery, also useful as a gargle or wash in ulceration of the mouth, according to Maude Grieve, author of A MODERN HERBAL.

Glasswort, *Salicornia europaea*, also called samphire. It is used as a substitute for *Crithmum maritimum* in England. The tender shoots are steeped in vinegar to make a good pickle.

LETTERS TO THE EDITOR

I have just had a copy of The Garden Journal passed on to me, and I have found it most interesting.

I note that members of your staff are interested in Venezuelan botany, and I wonder if any one can help me in my search for seeds of *Aristolochia sturtevanti*.

I found the article, "World Friendship through Gardening," very interesting and should like very much to correspond with a keen gardener. I am a committee member of both the Tauranga Garden Club and the Horticultural Society. In my garden I have over two hundred different perennials—and I know their botanical names. I find this is a necessity when sending abroad for seeds.

B. A. MILLER (Mrs.)
Box #374
Tauranga, New Zealand

Anent Hardiness of *Idesia polycarpa*. At the Brooklyn Botanic Garden there are some specimens of *Idesia polycarpa*, perhaps twenty-five years old — four in the systematic collection and another elsewhere on the grounds. These do not seem to suffer from our winters. However, these trees may have been planted out, as has been the practice with trees of doubtful hardiness, after having been rather well protected for a few years. This has permitted some trees to be grown to fine stature at the Brooklyn Botanic Garden that have not been considered reliably hardy.

North of the Rose Garden at The New York Botanical Garden, near the nursery, is a clump of perhaps four; one of these had some berries last year and promises more this year. So it would appear that *Idesia polycarpa* is not a great hardiness risk in this area.

GEORGE KALMBACHER
Taxonomist
Brooklyn Botanic Garden

You state that *Idesia polycarpa* is not hardy in your section (northern New Jersey). We have had it growing here for twenty-five years, and I know of plants outside of Boston. You probably know that it is not self-pollinating, but not dioecious.

LAURA L. BARNES, *Director*
Barnes Foundation
Merion, Pennsylvania

OPEN GARDEN DAYS

THE NEW YORK BOTANICAL GARDEN

The following dates have been set as Open Garden Days at The New York Botanical Garden for garden clubs and educational groups.

October 14, 1959	June 7, 1960 (Rose Day)
November 10, 1959	October 18, 1960
May 5, 1960	November 15, 1960
May 24, 1960	

Individual members of the Garden are welcome, too, to enjoy these Open Garden Days.

Throughout the day, the Garden's "Floral Flyer" will circle the grounds continuously to convey visiting groups from one area to another. Staff members will serve as guides on the "Floral Flyer," and other staff members will be available throughout the day to receive groups and answer questions.

The Garden is pleased to announce that the New York Herb Unit of the Herb Society of America will participate in the Open Garden Day on October 14, 1959, with an information booth in the Herb Garden and a display of herbarium specimens, old herbals and current books on herbs. Members of the New York Unit will serve as hostesses in the Herb Garden and in the adjacent Study Collection of Herbs.

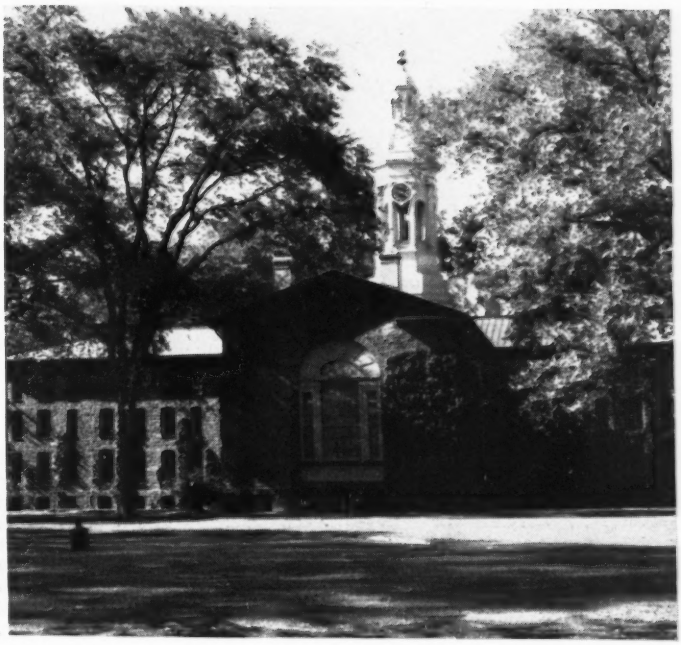
Garden clubs and education groups should let the Membership Secretary of The New York Botanical Garden know in advance on which of the above dates they will visit the Garden, also the number in the party and the hour of arrival.

Any garden club, educational group or individual member who plans to remain over the noon hour, should bring box lunch. Tea, coffee, soft drinks and ice cream will be sold in the Snuff Mill.

The New York Botanical Garden announces that these scheduled dates are the only ones when guided tours are available.

PLANTS at Princeton

Photographed by Howard W. Swift
Commentary by Dorothy Ebel Hansell



Nassau Hall is architecturally impressive beneath tall elms and historically the most interesting building on the campus of Princeton University.

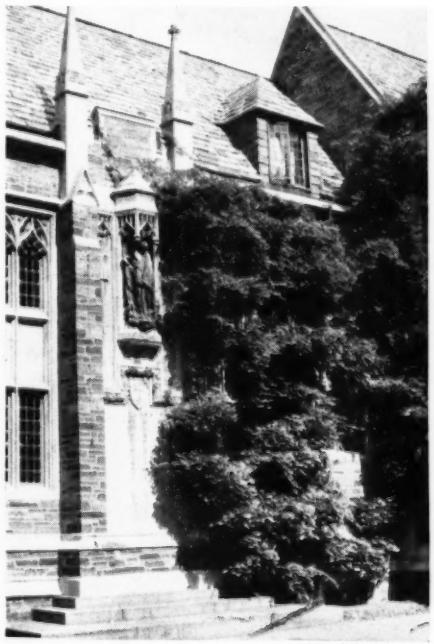
A LITTLE MORE THAN a year ago, Howard Swift, Assistant Curator of Education, walked into the Editor's office, and inquired, "Is there enough interesting material to be photographed around the campus of Princeton University for an article in the Garden Journal?"

"There are wonderful trees, some very old ones. The two large tuliptrees in front of the Dean's house on Nassau Street were planted in the year of the Stamp Act. And there was a fairly good collection of berried shrubs," the Editor replied. "I remember that James S. Clark of the Grounds Department had a creditable exhibit of berried shrubs a few years ago at a 'Garden Club of New Jersey Day' at Princeton. What the condition of the collection is now, I do not know—but I think it's worth a trip to find out."

So, equipped with camera and notebook, Mr. Swift and the Editor walked around that beautiful campus one day last September. And they did find some things worth recording, though not all the berried shrubs, not all the espaliered shrubs and vines that the Editor recalled from previous visits. Perhaps she did not look in the right location, perhaps Princeton's Grounds Department suffers, as do many institutions of learning these days, from budgetary restrictions in replacing and maintaining plant materials. For it is quite a maintenance item to train and to keep shapely espaliered shrubs and vines, even to trim vines climbing up the walls of buildings. We watched three men perched aloft on ladders, carefully clipping back English ivy into a pattern around the third-story windows of a dormitory.

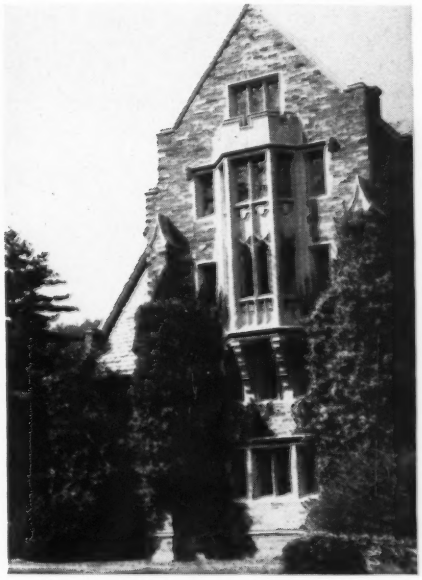
The general impression is that the architecture of Princeton's buildings is Gothic, and probably most of the dormitories and newer structures are a modification of the traditional Gothic. But other styles are represented. Early American Colonial is exemplified by Nassau Hall; Greek is typified by Clio Hall and Whig Hall; and Richardsonian Ro-

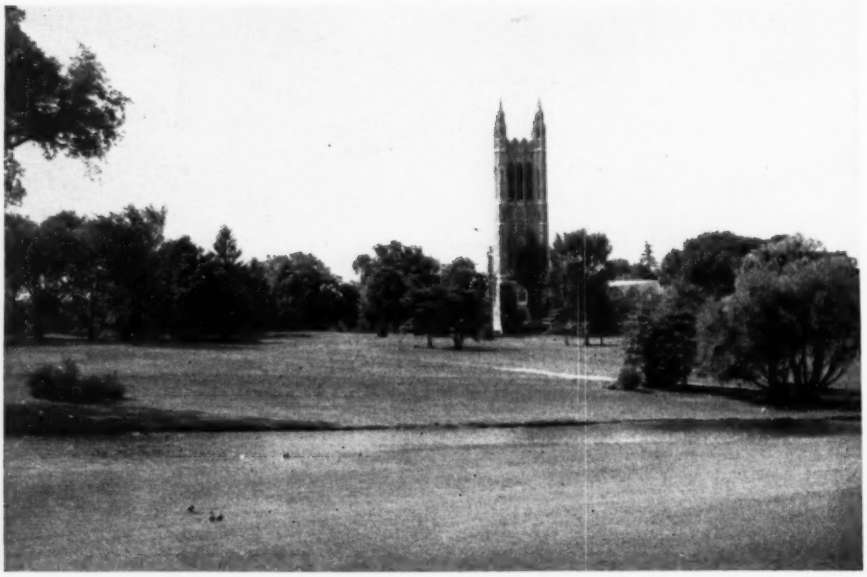
Wisteria grows luxuriantly on one of the side walls of Foulke Hall.



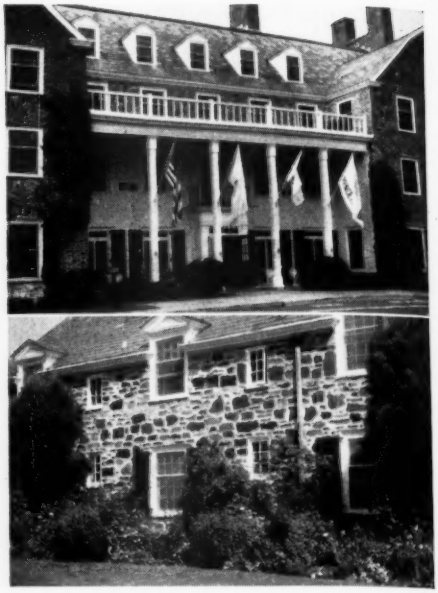
Pyracantha, espaliered on Laughlin Hall, is framed by an arch of Foulke Hall.

Heavily fruited English ivy clings to a corner of Pyne Hall.





This is the view of the majestic Grover Cleveland Memorial Tower of the Graduate College, seen from the terrace at the rear of Princeton Inn.



Princeton Inn, built in 1924, is nicely landscaped. Upper, main entrance; lower, rear of the Inn with its colorful border of annuals and perennials.

Left. This English yew, thirty feet high and twenty-five feet across, and carrying a heavy crop of red fruit, stands on the grounds of the Graduate College.

Clematis and ampelopsis climb over the Inn's toolhouse, a copy of an old gatehouse.

Lower left. *Oxydendron arboreum* is espaliered against a wall of the Graduate College.

Carpinus japonica forms a pleached allee in the Dean's garden at the Graduate College.

Picea bicolor on the grounds of "Prospect."

Picea abies var. *inversa* on the grounds of "Prospect."

Cedrus deodara on the grounds of "Prospect."

The garden at "Prospect" was planned by the first Mrs. Woodrow Wilson.

manesque by unique Alexander Hall. That these different styles do not jar and offend one's aesthetic sense too harshly is due to the partially concealing, softening influence and the shadows cast by trees and shrubs and vines.

Princeton University was founded over two hundred years ago by several Presbyterian clergymen for the "education of youths in the learned languages and in the liberal arts and sciences." The early classes were held in Elizabeth and Newark, New Jersey; in 1756, after Nassau Hall was erected, the college moved to Princeton, New Jersey.

Built of sandstone quarried in the nearby locality and designed by Robert Smith, architect of Independence Hall, and by Dr. William Shippen, Nassau Hall is still one of the most impressive structures on the campus. It is steeped in American history; it survived the fighting in its immediate vicinity during the Revolutionary War and also two serious fires, and for six months in 1783 was the capitol of the country.

Princeton is also historically interesting through several of its prominent

Close-up of foliage and fruit of *Magnolia macrophylla* from the grounds of "Prospect."

personalities. John Witherspoon, president from 1768-94, was a signer of the Declaration of Independence. One of the graduates of the Class of 1771 sat in the Constitutional Convention of 1787 — he was James Madison, the "father of the Constitution" and president of the United States for two terms. Woodrow Wilson, the thirteenth president of the university, 1902-1910, became the twenty-eighth president of the United States in 1913.

Woodrow Wilson Hall, named in his honor, accommodates the Woodrow Wilson School of Public and International Affairs. Another memorial to a president of the United States is the Grover Cleveland Memorial Tower of the Graduate College. The Graduate College, an imposing edifice in a modified treatment of traditional Gothic architecture, sits apart from the other university buildings in an attractively landscaped setting. The late Mrs. Beatrix Farrand, one of America's leading landscape architects and garden consultants, designed the grounds of the Graduate College and the Dean's garden. A feature of the latter is a pleached allee of Japanese hornbeam (*Carpinus japonica*). Nearby tulips, primroses, pansies, forget-me-nots and other spring flowers are followed by annuals and perennials in the box-edged beds. There are also beds devoted to roses. A fine hedge of Japanese holly extends along the top of a retaining wall, and specimens of box and yews serve as accents in this lovely garden.

Several of the university dormitories in the Gothic style of architecture have been effectively planted with evergreens at the entrances and corners, and with vines trained against their walls. The steps leading to Blair Arch have been nicely treated with a planting on each side consisting of mugo pine, yew, cotoneaster and *Jasminum nudiflorum*. Adjacent is a splendid specimen of the Empress tree (*Paulownia tomentosa*).

Several rare trees are to be found on the grounds of "Prospect," the residence of the president of Princeton University, as well as superb specimens of *Magnolia macrophylla*, copper beech, and others. The terraced gardens at "Prospect" were planned by the first Mrs. Woodrow Wilson, and from spring throughout summer and till frost are a riot of color with mass plantings of annuals and perennials.

Princeton Inn, where Mr. Swift and the Editor rested from their photographing and gathered their notes together, is simply but appropriately planted with dogwoods, hawthornes, junipers, arborvitae, pyracantha, other shrubs and vines, and perennials and annuals. The terrace at the back of the Inn commands a picturesque view of the Grover Cleveland Memorial Tower in the distance—across a placid pond and broad sweeping lawn. There were some interesting guests at the Inn—a reunion, apparently, of professors and their wives prior to the opening of the University—and also at the Graduate College. Many of the latter group were distinguished-looking foreigners. These were members of the Mont Pelerin Secretariat, an international society of economists which usually meets in a country in western Europe. This year the society met for the first time in the United States, at the invitation of American members; arrangements were made by Jasper Crane, member of the class of 1901 and former Alumni Trustee of Princeton University. The economists could not have had a more beautiful place for their deliberations.

BEGONIA HIEMALIS (from page 172)

ers are produced on a properly pinched plant.

The leaves are large and rounded and bright green; some varieties have a bronzy cast. The usual flowering season is from October to January, but we have had reports of continual flowering throughout the winter on such varieties as 'Altrincham Pink' and 'Rose Queen.' The plants are completely covered with blooms, and there are many fine colors in both single and double-flowered forms. Some of the single flowers measure three inches across and the ultra-double forms are as beautiful as the finest hybrid tea rose.

Here are some of the finest varieties obtainable in this country:

'Emily Clibran'—salmon-pink double
'Lady Roberts'—a sport of 'Emily Clibran' in old ivory
'Marietta' — beautiful shade of apricot, double
'The President'—glowing red, double
'Man's Favorite' — large single white, resembling dogwood, originated in Holland by the firm of Man's
'Exquisite'—single pink, dogwood-flowered
'Snowdrop'—pure white, double
'Pink Perfection' — rosebud-pink, perfect double
'Altrincham Pink'—perfect double, rosebud-pink
'Rose Queen' — semi-double, rose suffused with red
'Emita'—bright orange, single
'Flambeau'—salmon, double
'Van deMeers Gloire'—light salmon, single

There are few insects with these begonias. If begonia mite appears, which is detected by the curling of the new leaves, insecticide containing malathion will control this pest. They are sometimes exposed to a fungus known to growers as powdery mildew, which shows up as tiny white spots on the leaves. If sprayed at once with the new antibiotic, "Acti-dione," it is readily controlled.

EDUCATIONAL PROGRAM

September 1959 - June 1960

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THE NEW YORK BOTANICAL GARDEN
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BOOK REVIEWS

CAMELLIAS IN THE HUNTINGTON GARDENS, Vol. III, William Hertrich. 366 pages, illustrated, indexed. The Huntington Library, San Marino, California. 1958. $10.00.

It is fortunate, indeed, that such a volume will remain a source of authentic information for some two hundred of the most recent cultivars of *Camellia japonica*, besides sixty-three of the species *sasanqua* and its allied species. It represents a monumental task, setting a pattern for future *Camellia* nomenclature.

The source of the varieties as defined is most valuable, also the coloring of the flowers as established through the horticultural color chart. Only a William Hertrich with a meticulous mind and knowledge of the genus could have assembled this volume as he did the other two preceding it.

FREDERIC HEUTTE, *Supt.*
Norfolk Botanical Garden
Norfolk, Virginia

THE ROCKWELL'S COMPLETE BOOK OF ROSES. F. F. Rockwell and Esther C. Grayson. 332 pages, illustrated, indexed. Doubleday & Co., Garden City, N. Y. 1958. $5.95.

THE ROCKWELL'S COMPLETE BOOK OF ROSES is an excellent, well-written book concerning roses and their proper care. It contains many valuable illustrations to demonstrate different aspects of rose care; the chapter on watering is especially valuable because of the attention it gives to the importance of water in growing roses.

In general, the pruning chapter is good, and the chapter on rose diseases is excellent. However, the authors advise pruning new growth in the fall, which I believe is debilitating to plants because the roots will only be as large as the plant they have to nourish. In addition, stems are useful in storage of food in order to carry plants through the winter. The information on the new insecticides and other chemicals used in keeping plants healthy is also very valuable.

The chapter on the propagation of roses is so complete that this indication of how to develop new plants will more than pay for the price of the book itself.

The book also contains a good classification with the characteristics of various types of roses and the best new varieties in use today. If you have only one book on roses in your library, I suggest you obtain a copy of THE ROCKWELL'S COMPLETE BOOK OF ROSES.

A. D. MOLLIN, *D.D.S.*
Great Neck, New York

ROSES. L. A. Anstiss, H. P. Champneys, W. S. Brett, C. E. Pearson, R. C. M. Wright. 160 pages, illustrated, indexed. Abelard-Schuman, Ltd., New York. 1958. $3.75.

This well-written book contains many valuable chapters; however, due to the fact that it was written by Englishmen who were not accustomed to American conditions, its applicability to the United States is not great.

The chapters on formal gardens, rose history, and greenhouse growing are valuable. The discussions of formal gardens is very complete; however, the authors advise fall planting which is not as advantageous as spring planting in the United States. The authors also suggest planting the roses eighteen inches apart. I have found that if the roses are to be allowed to grow freely, they must be set at intervals of two and one half to three feet. However, the chapter has many worthwhile suggestions which the devotees of the formal garden might find useful.

The greenhouse discussion is more complete than found in most books and contains many valuable pointers.

The discussion on pest control had a number of faults, and the varieties of roses described were not too good. Many of the varieties can not be bought in the United States. The authors did not give proportions and percentages of insecticides and other chemicals used to control or eliminate pests. In addition, the authors were not up to date on the newer, more effective chemicals.

A. D. MOLLIN, *D.D.S.*
Great Neck, New York

A TREASURY OF ROSE ARRANGEMENTS AND RECIPES. Clements, Julia. 86 pages, illustrated, indexed. Hearthside Press, New York. 1959. $3.50.

Here is a book which ought to be in every rose lover's library. In it Miss Clements has covered many facets of the use of the rose.

Arranging the flowers for home decoration or exhibition at flower shows is thoroughly treated with detailed information on using various types of roses, both old and new, in many classifications; also roses in combination with other flowers, with suggested types of containers for different situations. Useful suggestions are made on properly cutting and preparing roses so that the blooms will last longer.

The book is beautifully illustrated with excellent pictures.

There are a number of recipes for making conserves, salads, wines, pot-pourri and so forth from rose petals and hips, some of which, no doubt, will prove very interesting and are certainly worth a trial.

Unfortunately, it is not possible to review this fine book adequately in just a few paragraphs, but it is really a worthwhile, interesting publication.

DOROTHEA BOBBINK WHITE
East Rutherford, New Jersey

AMERICAN ROSE ANNUAL 1959. Abrahamson, Frank H. (Ed. By). 266 pages, illustrated, indexed. American Rose Society, Columbus, Ohio. 1959. $4.50.

This Annual follows the long-established pattern of squeezing between covers a varied fare of rose information, written by both technical workers and amateur growers. Throughout the forty-two articles, there's much information on rose performance in all parts of the country, new slants on cultural practices, and latest findings on disease and pest control. A few wisps of humor are threaded through the book, such as an article on "Tht Rosarian's Guide to Birds," which describes such easily recognized species as the "scissor-billed slasher, tufted ribbonsnatcher, and organic preacherbird."

As in previous editions, the section called "Proof of the Pudding," in which scores of varieties introduced within the last six years are criticized by dozens of reporters, fills a quarter of the book. There are twenty color plates of new rose varieties.

PAUL F. FRESE
Editor of Publications
Brooklyn Botanic Garden

GARDENING IN CONTAINERS. 112 pages, illustrated. Lane Publishing Co., California. Sunset Book. 1959. $1.75.

Since Sunset Books are western publications, this one naturally features plants and containers which thrive in a more temperate and even tropical climate than we have here in the East. For example, there are many plants blooming abundantly out-of-doors which would be killed by our cold winters; there are many containers which would crack under a steady diet of zero weather or even more so under the swift changes from zero to above freezing and back to the teens again.

There are, however, many parts of this book which should appeal to the eastern gardener. It has copious illustrations of plants and containers for window-boxes, patios, pent-houses, and inside window plantings. The experimental gardener can get ideas from these pictures and descriptions and apply them to his own location and climate, varying the container material and/or the plants suggested. As the majority of eastern apartments are kept at almost tropical heat during the winter, there should be no difficulty in growing house plants in the ways suggested by this magazine and under similar soil conditions. The eastern house plant fancier should be able to compete with the western one.

This publication should be of interest to anyone devoted to plants and flowers whether or not he is a grower; it should encourage many who have had the urge but not the knowledge or courage to try to grow plants and to experiment. It should be enjoyable and instructive to any lover of flowers or dabbler in house plants no matter where he lives. It should acquaint the traveler with the flowers he can expect to see on his tours.

The listing of plant names and their culture is very clear, authoritative, and understandable to the amateur gardener.

ALYS SUTCLIFFE
Brooklyn Botanic Garden

SYMBOLISM IN FLOWER ARRANGEMENT. Ferry, Ervin S. 149 pages, illustrated, indexed. Macmillan Company, New York. 1958. $4.95.

Everyone interested in flower arrangements should read Ervin S. Ferry's fascinating book, SYMBOLISM IN FLOWER ARRANGEMENT.

While on a trip around the world Mr. Ferry, a scholar of wide experience, became intrigued by a flower show in Japan. In Kyoto he studied towards the Japanese degree of Flower Master, and for the next twenty years flower arranging was his chief hobby.

Mr. Ferry brings to us the result of extensive and devoted research in the collection of flower lore from around the world. He opens the door into the symbolic meaning of two hundred plants with the

(Continued on page 184)

BOOK ORDERS

Please send your check or money order, made out to The New York Botanical Garden, when you place an order for books through Book Service.

Members are entitled to 10% discount on the list price. Hereafter, the Garden will pay the postage for delivery of the books.

NEWS, NOTES and COMMENTS

Reception for Graduates of the Two-Year Course in Botany and of the Two-Year Course in Gardening was held on June 18, 1959, in the Assembly Room of the Snuff Mill. The graduates, their friends and relatives and invited guests brought the number present to over a hundred.

After a brief welcome by T. H. Everett, Assistant Director for Horticulture and Curator of Education, Dr. Edwin B. Matzke, Professor of Botany at Columbia University, gave a most interesting and thought-provoking address, entitled "Peering into the Future." (Dr. Matzke's address is published elsewhere in this issue of THE GARDEN JOURNAL.)

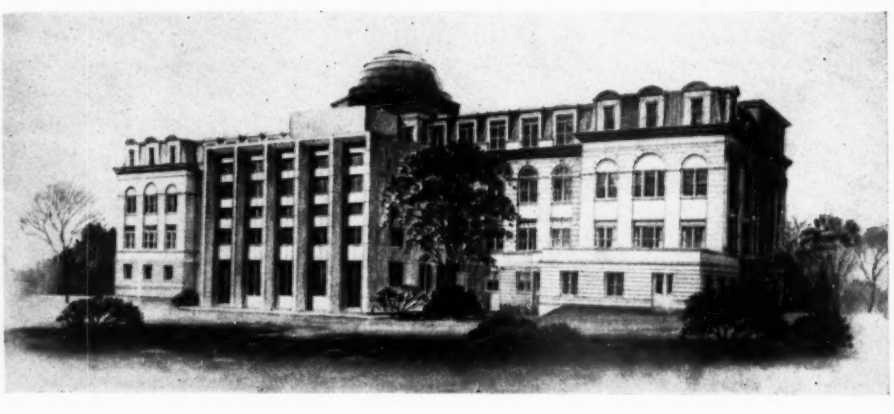
Mrs. William C. Steere presents certificate to Mrs. Ray S. Sayers, who satisfactorily completed the the Two-Year Course in Practical Gardening. Mrs. Lillian Weber, Instructor in the Educational Department, and Howard W. Swift, Assistant Curator of Education of The New York Botanical Garden, assist.

In the absence of Mrs. Harold I. Pratt, certificates were presented to the graduates by Mrs. William C. Steere: in the Two-Year Course in Botany to Lincoln S. Adderley, Elise L. Bowles, Dennis A. Brogdon, Arthur Doody, Lee Erde, Florence M. Green, Helen Hasselriis, Donald L. Hendrickson, Pearl Schwartz, Milton Seidler, Robert Shortway; and in the Two-Year Course in Practical Gardening to Lincoln S. Adderley, A. Archimowitsch, Edna M. Bambay, Dennis A. Brogdon, John L. Coulon, Velma I. Cypher, Dominic Di Sario, Arthur Doody, Ralph B. Gaeta, John V. Hewitt, Augusta O. Hoffman, Harold La Tour, David L. McCarroll, Louise McCarroll, Marjorie McDermott, John L. McHale, Thomas J. McKenna, Constance Miller, Ray S. Sayers, John Schevera, Esther Streifus, Lillian Yablon.

The Building Committee of The New York Botanical Garden is happy to announce that the plans for the greatly needed Library Wing are now ready. These plans represent over a year of work and have been approved by the Director, The Board of Managers and the Staff. For many years, our great horticultural and botanical library has been badly overcrowded and inadequately housed, and the proposed wing will correct a very serious situation. The new wing will be fire-proof and air-conditioned. The estimated cost will be about one million dollars, of which the Garden must raise the major part. This is a very great challenge to the membership and friends of The New York Botanical Garden, and it is also a very great privilege to share in preserving our great Library for posterity.

All gifts are tax deductible. Let us all give as generously as we can so that the Library Wing will soon be a fact and not just a hope.

ANGELA M. PLACE, *Chairman*
(Mrs. Hermann G. Place)
Millbrook, New York



Architect's sketch of the proposed addition to the Museum and Administration Building of The New York Botanical Garden to accommodate the Library.

The Closing Ceremony of the summer institute for high school students at The New York Botanical Garden under a grant from the National Science Foundation was held in the Snuff Mill on August 7, 1959. Each student was awarded a certificate of participation. Dorothy Bedigian gave a very fine talk on her experiences as one of the students at the institute—this, it is hoped, will be published in a forthcoming issue of THE GARDEN JOURNAL. Dr. David Rogers, Curator of Economic Botany at the Garden, and Dr. Jerome Metzner, Chairman of the Department of Biological Sciences of the Bronx High School, the directors of the institute, also addressed the gathering of students, their parents and friends.

The students paid spontaneous and rewarding tribute to the teaching staff by the presentation of a hand-illuminated scroll —in this way they thanked "those dedicated individuals who worked that we might learn." This scroll, with the names of the students and their high schools, will be displayed at the Garden and will be kept as permanent record of the first summer institute.

The students met with Dr. William C. Steere, Director of The New York Botanical Garden, and with Dr. Rogers and Dr. Metzner, to formalize plans for continuing activities in botany. The expectation is that there will be a junior botanical society under the aegis of The New York Botanical Garden. This outcome indicates, perhaps better than any other way, the value derived from the summer's endeavors. Additional evidence of student interest is indicated by the attendance record—practically no absences.

The New York Botanical Garden has been awarded a grant of $145,400 by the National Science Foundation for the support of a plant survey of the Guiana Region of South America under the direction of Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research, and Dr. John J. Wurdack, Associate Curator. The grant, which will be five years in duration, became effective July first of this year.

Dr. Wurdack has been in South America since May. Dr. and Mrs. Maguire departed July 31 for Colombia where they will remain until the middle of September. The next two weeks will be spent in Ecuador. They are scheduled to arrive in Peru on October 2 and to explore in that country until mid-October before leaving for two weeks in Bolivia. Arriving in Brazil the first of December, they will be joined by Dr. Joao Murca Pires, who is in charge of botany at the Instituto Agronomico do Norte at Belem, and will work with him.

These current expeditions of Dr. Maguire and Dr. Wurdack are being carried out by other than National Science Foundation grants.

The New York Botanical Garden also received a National Science Foundation grant of $20,100 of three years' duration for the support of basic research on monographic studies in the Hypocreales (Ascomycetes) under the direction of Dr. Clark T. Rogerson, Curator of Cryptogamic Botany.

The third grant to the Garden — $6,000

The Rose Garden of The New York Botanical Garden on Rose Day, June 10, 1959. The Rose Garden will be lovely again in October.

for one year — is for the support of basic research on the characterization of casual agents in the crown-gall of plants under the direction of Dr. Richard M. Klein. Dr. Klein holds the Alfred H. Caspary Curatorship at The New York Botanical Garden.

Dr. David D. Keck, Assistant Director of The New York Botanical Garden, currently on leave for two years as Program Director for Systematic Biology in the National Science Foundation, in Washington, D.C., has decided to remain in his new position. His resignation from the Garden, effective July 1, 1959, means a great loss to the Garden, because of Dr. Keck's wise guidance and his outstanding status as a botanist. We wish him the greatest of success and happiness in a sensitive and responsible position of national significance to science.

T. H. Everett, Assistant Director for Horticulture and Curator of Education of The New York Botanical Garden, was honored at the one hundred and ninety-third commencement of Rutgers University when an honorary Master of Science degree was conferred upon him by Dr. Mason W. Gross, newly appointed President of Rutgers. Dr. Gross said: "A master of the art of gardening, you have added dignity and significance to your profession. A native of England, you have brought to your adopted country a tradition of horticultural elegance which you have grafted onto a vigorous American root. Through your position as Horticulturist and Curator of Education of The New York Botanical Garden and as a lecturer, author, and teacher, you have nurtured and developed a delight in plant life in the hearts of our countrymen.

"Therefore, by virtue of the authority vested in me by the Board of Governors of Rutgers, The State University, I hereby confer upon you, *honoris causa*, the degree of Master of Science, with all the rights, privileges, and immunities appertaining thereto."

Dr. P. P. Pirone, Plant Pathologist of The New York Botanical Garden, gave a talk on "Why Trees Die on City Streets" before the thirty-fifth National Shade Tree Conference in Detroit, Michigan, August 17-21, 1959. Dr. Pirone's talk will appear in a forthcoming issue of The Garden Journal.

Thomas C. Blainey, who had been arboretum foreman in the Gardening Department of The New York Botanical Garden under Louis Politi, Horticulturist, is now horticulturist at the U.N.

Dr. Andre Kostermans, Head of the Botanical Division of the Research Institute, Bogor, Indonesia, gave an illustrated talk on "A Botanist in Indonesia, on an expedition in Central Borneo in 1957" at a seminar of the staff and students of The New York Botanical Garden.

Dr. Oscar Kühnemann pursued his studies on bryophyta under a Guggenheim fellowship for several months at The New York Botanical Garden. Dr. Kühnemann is on sabbatical leave as Director of the Department of Botany, Faculty of Exact and Natural Sciences, University of Buenos Aires, Argentina.

Prof. Jean Politis of the Department of Botany, University of Athens, Greece, spent three months in the Research Laboratory of The New York Botanical Garden as visiting investigator. Another visiting investigator in the Laboratory this past summer has been Dr. Elsa O'Connell, one of Dr. Kühnemann's students from Buenos Aires. Dr. O'Donnell is studying the taxonomy, morphology and cytology of green algae and the cytology of the nucleolus of *Spirogyra*.

Larry Jensen, a senior at Brown University, studying botany and taxonomy, assisted in the herbarium this summer under Dr. Bassett Maguire.

Mrs. Ginsui Kobayashi and Mrs. Seisui Ide demonstrated the use of roses in Japanese flower arrangements on Rose Day, June 10, 1959.

Dr. William J. Robbins, Director Emeritus of The New York Botanical Garden, and President of the American Philosophical Society, was elected executive officer of the Society at its annual meeting, succeeding Dr. Luther Eisenhart who had served in that capacity for seventeen years. THE NEW YORKER, July 18, 1959, carried an extensive article by Geoffrey T. Hellman, in his inimitable manner, on this meeting.

Joseph R. Swan, Past Chairman of the Board of Managers of The New York Botanical Garden, Mrs. Robbins, Mr. and Mrs. Henry Wallace, Sir Charles Galton Darwin, physicist grandson of the original Charles Darwin, and many others among the notable scientists and professional men and women at the meeting were cleverly woven into Mr. Hellman's story.

The Staff at Meetings: Dr. William C. Steere, Director; Dr. H. W. Rickett, Acting Assistant Director for Botany and Bibliographer; Dr. Arthur Cronquist, Curator; Dr. Clark T. Rogerson, Curator for Cryptogamic Botany, and Dr. Annette Hervey, Research Associate — all of The New York Botanical Garden — attended the International Botanical Congress in Montreal, Canada, August 19-29, 1959. Dr. Steere also attended the meetings of the American Institute of Biological Sciences, as did Dr. P. P. Pirone, Plant Pathologist, held in State College, Pa., August 30-September 3, 1959. Mrs. Dorothy E. Hansell, Editor of The Garden Journal of The New York Botanical Garden, attended the forty-fifth annual conference of The National Association of Gardeners in Philadelphia, Pa. August 25-27, 1959.

Recent visitors to the Garden included Dr. P. Maheshwari, Chairman of the Department of Botany, University of Delhi, who is especially interested in gymnosperms; Philip Chandler of the Department of Plant Pathology, University of California, Los Angeles; Dr. R. van der Wijk, Botanisch Laboratorium der Riiks Universiteit, Groningen, The Netherlands; Dr. Olaf Selling, Paleobotaniska Avdelningen, Riksmuseum, Stockholm, Sweden; Dr. Volkmar Vareschi, Instituto de Botanico, Caracas, Venezuela, whose special interest is ferns; Dr. J. H. Davie, Clifton College, Bristol, England, spending six months at Yale University as a research fellow in botany; Dr. José des Js. Jiménez, Santiago, Dominican Republic; Dr. Phil. Hillel Oppenheimer, James de Rothschild Professor of Horticulture, Hebrew University, Rehovoh, Israel; Dr. G. Troupin, I.R.S.A.C., Liviro-Bukavu, Belgian Congo — also assistant curator of Brussels Botanic Garden during the past twelve years; Dr. C. N. Williams, University College, Ibadan, Nigeria — plant physiologist interested in mushrooms; Dr. Herman Ziffer, National Institute of Health, Washington, D. C.; Dr. Sam Shushan, lichenologist from the University of Colorado, Boulder, Colorado; George R. Proctor, Institute of Jamaica, Kingston, Jamaica; Dr. Karl H. Rechinger, Naturhistorisches Museum, Wien, Austria.

Also Paul Renton, San Antonio, Texas, Mrs. Margaret Smith, Indianapolis, Indiana, and Mrs. Elsie Cochrane, Hartford, Conn., members of the Garden Writers' Association of America. They came to New York City to join the group that visited the National Laboratories at Brookhaven, L. I. Arrangements for this trip, in which Dr. H. W. Rickett, Acting Assistant Director for Botany and Bibliographer, and Mrs. Dorothy E. Hansell, Editor of THE GARDEN JOURNAL of The New York Botanical Garden, also participated, were made by Miss Carol Woodward, Editor of Outdoor Books of Macmillan & Co.

The Gertrude S. Burlingham Scholarship in Mycology at The New York Botanical Garden has been awarded to Ronald H. Petersen for the summer of 1959. Mr. Petersen is working on a taxonomic survey of the aquatic Hyphomycetes in the New York City area, as part of his predoctoral program at Columbia University.

Stephen F. Tillett, who is working for his Ph.D. under Dr. Philip A. Munz at Claremont College, Claremont, California, has joined the staff of the Herbarium of The New York Botanical Garden, and will be working on the tropical program under Dr. Bassett Maguire.

George Eiten who was awarded a Ph.D. by Columbia University in June 1959, will spend the next three years at the Instituto de Botanica in Sao Paulo, Brazil, under Dr. Alcides Ribeiro Teixeira, Director. Dr. Eiten pursued his botanical studies at The New York Botanical Garden under Dr. Bassett Maguire; his thesis was on the genus *Oxalis*.

Dr. George H. M. Lawrence has been appointed Director of the new Rachel McMasters Miller Hunt Botanical Library. The appointment, which will become effective in the fall of 1960 when the library is expected to be completed, was announced by Dr. John C. Warner, President of Carnegie Institute of Technology at Pittsburgh.

The unique library will be situated in a penthouse atop the Hunt Library — both made possible through a gift of $2,800,000. from Mr. and Mrs. Roy A. Hunt. The botanical library will house Mrs. Hunt's rare collection. The two thousand titles include incunabula, herbals, color plate books, and an exceptional collection of botanical prints and drawings.

Dr. Lawrence envisions the library as being developed to serve as a national center for bibliophile research and service in the fields of botany and horticulture.

Dr. Lawrence, who has served as Director of the Liberty Hyde Bailey Hortorium at Cornell University since 1951, is an international authority on horticulture and botany. An accomplished author, he has published almost eighty articles and three books.

Eric Walther, retired director of the Strybing Arboretum and Botanical Garden, San Francisco, California, died July 1, 1959. With almost fanatical devotion to his work and with extraordinary vision of what could be accomplished, Mr. Walther created a remarkable collection of living plants.

The arboretum, started during the last years of the depression, soon thereafter faced the World War II period with labor shortages and other problems. But the gardens continued to grow under his direction and upon his compulsory retirement in 1957 were known throughout the world.

He was made a research associate of the California Academy of Sciences and after his retirement, Mr. Walther was to be found there five days a week working on his monograph of the genus *Echeveria*.

State University College of Forestry at Syracuse University, Syracuse, New York, has promoted eight members of the faculty, according to an announcement by Dr. Hardy L. Shirley, dean.

Advanced to full professorship were: Carmin P. Donofrio, professor of pulp and paper technology; Dr. John L. Morrison, professor of forest botany; Bradford G. Sears, professor of landscape architecture; and Dr. Hugh E. Wilcox, professor of forest botany.

Advanced to associate professorships were: Russell C. Deckert, associate professor of forest utilization; Dr. Howard C. Miller, associate professor of biology; Dr. Savel B. Silverborg, associate professor of forest pathology; and Gerald H. Smith, associate professor of forest utilization.

Fourteenth American Horticultural Congress will be held at the Hotel Sheraton, Rochester, New York, October 7-10, 1959.

Andre De Vilmorin, Vice-President of the French Horticultural Society, will give a talk at the President's Dinner on October 7. Other speakers during the Congress include George Spalding, Superintendent of the Los Angeles State and County Arboretum, and Wilbur Wright, Director of Rochester Parks. Dr. A. W. Dimock, Dr. John Naegele and Dr. F. C. Steward will take part in a special program, entitled "Cornell Presents."

A field trip has been arranged on October 9 to the State Agricultural Station at Geneva and to Jackson and Perkins at Newark, and a bus tour of Rochester's parks for the morning of October 10.

National Wildlife Federation has announced its 1960-61 program of scholarships and fellowships in conservation — James Hopkins Scholarships for undergraduates up to $500, graduate student fellowships and post graduate or special student fellowships up to $1,000. For information: Executive Director, National Wildlife Federation, 232 Carroll Street, N.W., Washington 12, D.C.

"Floriade 1960." Rotterdam, The Netherlands. Dr. Russell J. Seibert, Chairman of the American Horticultural Council Committee on the Rotterdam exhibition, has announced that the President of the United States signed into law a bill appropriating $150,000 in counterpart funds through the Foreign Agricultural Service of the United States Department of Agriculture for American participation in the exhibition, scheduled to run March 25-September 25, 1960.

Carl Wedell, representing the American Horticultural Council, Kenneth Krought, Head of the F.A.S. Trade Fair Branch, U.S.D.A., and Gustave Springer, "Floriade 1960" representative in America, visited the site of the exhibition in Rotterdam the latter part of June to obtain details of the location of the American exhibit. Mr. Wedell, a former president of the American Horticultural Council, has been appointed Director General to manage American participation in the exhibition.

Joseph J. Lane will head a fund-raising committee to raise American currency—the fund to be administered by the treasurer of the American Horticultural Council for "Floriade" use. Mrs. Anne Wertsner Wood will head a committee representing garden club participation in flower arranging at the exhibition in Rotterdam.

Pennsylvania Horticultural Society has announced that Carlton B. Lees, of Kingwood Center, Mansfield, Ohio, became its executive director August 1, 1959. Mr. Lees,

Robert Moses, Commissioner of Parks of New York City, and A. Holly Patterson, Nassau County Executive Officer, assist Mrs. Etienne Boegner as she cuts the garland at the dedication ceremony. At right is a view from the pergola into the walled Italian garden of Old Westbury Gardens.

who had been at Kingwood five and a half years, was previously teaching assistant in the Department of Ornamental Horticulture at Cornell University, and assistant horticulturist at Brooklyn Botanic Garden.

Mr. Lees is chairman of the Committee on Education of the American Association of Botanic Gardens and Arboretums. He has written many articles, and his book, BUDGET LANDSCAPING, will be published by Henry Holt & Co. in March 1960. It is based on the popular course in landscaping taught by Mr. Lees at Kingwood Center for owners of small homes.

"Greenhouse Gambol" will be held by the Sasqua Garden Club in the Fairfield County Hunt Club, Long Lots Road, Westport, Connecticut, October 3, 1959, for the benefit of the Mid-Fairfield County Youth Museum.

There will be a sale of house plants, perennials, and rare bulbs; also an auction of antiques and choice porcelain. The articles to be auctioned will be on exhibit from 2-3 p.m., when the auction will begin. At 5 p.m. there will be a drawing for a Lord and Burnham Sunlyt greenhouse, valued at more than one thousand dollars.

Admission will be one dollar. For further information, contact Mrs. James P. Kinard, Brookside Drive, Fairfield, Connecticut, telephone CLearwater 9-8119.

Seeds of the double fibrous begonias Fi hybrid 'Blushing Baby' and plants of the giant double gloxinia 'Royal Flush' will be offered this fall by George W. Park Seed Co., of Greenwood, South Carolina.

Of a pure light pink, 'Blushing Baby' is perfection itself against the waxen sheen of the medium green leaves. George W. Park Seed Co. has been striving for this color ever since introducing the red-flowering cultivar, 'Christmas Candle' in 1957.

Gloxinia 'Royal Flush' has very large double flowers of royal blue with white edges; these are produced freely on a compact plant. The extra petalage makes for a brilliant colorful display.

Old Westbury Gardens, Old Westbury, Long Island, was formally opened to the public on July 2, 1959. The dedication of the John S. Phipps estate as a botanical garden and arboretum was witnessed by some three hundred public officials and civic, cultural and educational leaders.

Participating in the ceremonies were Robert Moses, Chairman of the Long Island State Park Commission and Commissioner of Parks of the City of New York, A. Holly Patterson, Nassau County Executive, Dr. George S. Avery, Jr., Director of the Brooklyn Botanic Garden, and Mrs. Etienne Boegner. Mrs. Boegner, daughter of the late Mr. and Mrs. John S. Phipps, is president of Old Westbury Gardens, Inc., the nonprofit organization that will operate the gardens.

Michael Phipps, serving as master of ceremonies, stated that the decision to open the family gardens to the public had its genesis when his grandfather, Henry Phipps, many years ago gave Phipps Conservatory to Pittsburgh. His father, John S. Phipps, was so pleased to learn from strangers how much they enjoyed the Conservatory that he established a foundation and one of its main functions is to preserve parks, woodlands and beaches. The trustees of the John S. Phipps Foundation felt it was fitting that the estate should be preserved for the public in memory of Margarita Grace (Mrs. John S.) Phipps.

The parks and preserves which John S. Phipps was instrumental in founding for the public's use are a wild life sanctuary at Barnegat Bay, New Jersey; Cape Hatteras, Point, North Carolina; Phipps Ocean Park in Palm Beach, Phipps Park in West Palm Beach, John S. Phipps Park in Martin County, Florida; and the Silver Lake Boy Scout Camp, Leon County, Florida.

The New York Botanical Garden was represented by Mrs. John E. Lockwood, member of the Board of Managers and of the Advisory Council, Mrs. John Winchester, co-chairman of the Volunteer Associates, and T. H. Everett, Assistant Director for Horticulture and Curator of Education. Charles D. Webster represented the Horticultural Society of New York and Mrs. Webster the Garden Club of America. Mrs. Webster and Mrs. Winchester are on the board of directors of Old Westbury Gardens, Inc.

Old Westbury Gardens occupy seventy-one acres of the three hundred acres of the famed Phipps estate. The outstanding features are four formal gardens patterned after those found in the "great parks" and manors of eighteenth century England and designed by the English architect, George Crawley, in 1906. These are a rose garden, a boxwood garden, an Italian garden of fruit trees, and a lily pond.

In addition, there are informal gardens, natural pools, and gently rolling land rich in shrubs and towering old trees. According to the Long Island Horticultural Society, the trees include the largest of their kind on the Island — red maple, weeping purple beech, weeping flowering dogwood, star magnolia, white pine, dwarf hinoki cypress, and a brittle willow considered to be the largest in the country.

Westbury House, a thirty-room Georgian mansion, will eventually be opened to the public as a museum.

For its first season, Old Westbury Gardens will be open 10 a.m. - 5 p.m. on Tuesdays, Thursdays and Saturdays until October 15. There is an admission fee of $1.00 for adults and $.60 for children under fourteen years of age.

International Democracy in Science at Work. A bright, and often overlooked, facet of international relations was displayed when world-renowned scientists assembled at Boyce-Thompson Institute for Plant Research, in Yonkers, New York, August 10, 1959, for the first session of the Fourth International Congress on Plant Growth Substances. These men spent four days together in exchanging ideas freely, in telling each other of the latest developments in their respective countries, in de-

JUST ADD TO WATER, SPRINKLE OR SPRAY!
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bating the best course for further investigation, and each was free to take back as much or as little of the ideas as he could master.

The Congress drew men from many nations. The participants were chosen because of their known ability and knowledge rather than the power of their country or the traditions and venerability of the learned institutions they represented. They came from the Orient and the Occident and from both sides of the "iron curtain"—wherever plant science is flourishing. This is the progressiveness of democracy working through science, where ability to produce for the common good is the criterion of worthiness.

Another interesting facet of these meetings to a layman was the nature of the subjects. These scientists considered the so-called plant hormones that serve as chemical messengers as they move from tissue to tissue, regulating the orderly development of the plant. They briefly dwelled on the production of plant regulants, such as gibberallic acid, by fungi that attack plants or live in the soil. They looked into the design of organic molecules created synthetically by chemists to see how their performance can be improved or new types created. They discussed these very basic ideas because they believe that an understanding of basic principles is the shortest pathway to the solution of very practical problems.

These scientists are keenly aware of the need of practical progress. Few nations approach the standards of the United States in producing food and fiber for its people; probably two-thirds of the people in the world are under-nourished and inadequately clothed. Their numbers increase by tens of millions each year, almost three million in the United States alone. The more productive, arable land of the world is fully cultivated, so means must be found to make it more productive, or to extend the range of cultivation of plants to less productive areas.

These improvements in plant usefulness can be achieved either by breeding new varieties or changing the chemical processes of existing ones. Great strides are being made through both of these research approaches. The group that assembled for the Congress is primarily concerned with the latter, that is, the chemistry of plants.

These men are not to be taken lightly, because in the past fifteen years they have demonstrated that weeds can be taken out of crops selectively by chemicals, so one man working in a chemical factory can do the work of one hundred and fifty men in the field with hoes. The wonder chemical 2,4-D that was discovered at the Boyce Thompson Institute in 1941 was used at the rate of thirty-eight million pounds in 1958. These scientists can thin apples when there are too many on the trees or prevent fruit drop at harvest by the use of chemicals. They have doubled the size of a bunch of grapes through their knowledge of chemistry.

Tomorrow they may free plants from their complete dependence upon the length of day required for flowering, or modify their growth so two crops can be grown where one is now the rule. They have a dream, the dream of improving plant culture by understanding plants better.

The New York Botanical Garden and the Brooklyn Botanic Garden were co-sponsors with the Boyce Thompson Institute for Plant Research of this Congress.

TO MEMBERS OF THE NEW YORK BOTANICAL GARDEN

You who are enjoying membership in The New York Botanical Garden may have friends who would also enjoy membership in this institution. We would be happy to have you approach them about becoming members of the Garden. However, if you would prefer to send their names and addresses to us, we shall be happy to invite them to join The New York Botanical Garden.

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BOOK REVIEWS (from page 179)

materials and accessories that express in the language of flowers, particular emotions and sentiments. We find useful reference lists.

In a chapter on "Branches and Flowers that Speak," he blends in a delightful way the myths or customs that gave the flowers and branches their meaning with lines from well-known poets such as:

Oh lovely and lowly arbutus
As year into year succeeds,
Be thou the laurel and emblem
Of noble and unselfish deeds.
Henry Abby

In the chapter on the oriental background we learn the two fundamental principles of Japanese flower arrangement.

The purpose of the book, SYMBOLISM IN FLOWER ARRANGEMENT, Mr. Ferry tells us, is to reveal the conditions under which a plant or flower composition may evoke an idea, convey a message, or arouse an emotion in the mind of the viewer.

EDNA S. PENNELL, *Flower Supervisor*
Colonial Williamsburg, Virginia

INTERNATIONAL CODE OF NOMENCLATURE FOR CULTIVATED PLANTS. Formulated and adopted by the International Commission for the Nomenclature of Cultivated Plants of the International Union of Biological Sciences. Available from The American Horticultural Council, Arnold Arboretum, Jamaica Plain 30, Mass. 1958. 50¢.

Even the veriest amateur gardener has been puzzled and perplexed at times by the names he reads in catalogues and articles in the horticultural press, and wonders if the plant he is now reading about is the same as or different from one he knows under approximately the same name.

This code is a purely artificial attempt to the laudable end of bringing all such confusion to an end. It is patterned largely on the same sort of classification that holds for scientific nomenclature, a field in which the "rules of the game" now prevail. Like many other things that are "good for one" this is, on first reading, difficult, and in some ways unpleasant. Some of it will appear as "jargon," and there is still some basis for refusing to accept some of the new terms that are proposed for general use.

Undoubtedly, the people who will lean on it most effectively will be editors, and

printers. It will give them an "authority" to invoke.

If one is to cavil at anything, it is that this, too, is one more expression of the spirit of the times, leading to organization and direction from above, tendencies in our whole life that are unpleasant to consider and hard to bear.

B. Y. Morrison
Pass Christian, Mississippi

INSIDE THE LIVING CELL. Butler, J. A. V. 170 pages, illustrated, indexed. Basic Books, Inc., New York. 1959. $3.50.

Dr. Butler, a distinguished British biologist, has in Inside the Living Cell written a book for the layman which virtually every experimental biologist has thought of writing. Furthermore, he has done a fine job of it.

The book is a brief but quite accurate discussion of current research in the relatively new inter-disciplinary field called Cellular Biology. Butler assumes, with considerable justification, that ". . . all living organisms are very similarly constructed and operate in very similar ways." Admittedly, a tree can't curl up in your lap and purr and no known dog can carry on photosynthesis. Nevertheless, the biochemistry, cytology, reproduction and integrative mechanisms of an Angora and an ash are sufficiently alike on a cellular level to permit the results of research on a fungus to be of immediate application to studies on the cells of animals, bacteria and even viruses. The author writes lucidly on these problems.

Attempts to integrate the exceedingly voluminous scientific literature in these varied fields requires an agile mind and facile pen. The author has both these rare capacities and, in addition, he manages to project his intense enthusiasm for all the amazing functions of living cells.

The book is not hammock reading. It requires a straight chair and a good reading lamp. The reader will be amply rewarded for his efforts.

Richard M. Klein

BACTERIOPHAGES. Adams, Mark H. 592 pages, indexed. Interscience Publishers, New York. 1959. $15.00.

Bacteriophages, in progress at the time of Mark Adams' death in 1956, has been completed by an outstanding group of Adams' fellow scientists in this country and abroad. It is a remarkable work, indispensable to students of biology and, as such, stands as a just memorial to a first-rate teacher and scholar.

The study of bacterial viruses, bacteriophages, has been pursued intensively in recent years, and the wealth of information accumulated thereby has been of extreme value to all virologists, particularly students of animal viruses. The twenty-two chapters of Adams' elegant book include authoritative coverage of the infective process, the size and morphology of bacteriophages (E. L. Kellenberger's electronmicrographs are beautifully reproduced), the effects of radiation and various physical and chemical agents on bacteriophages, their chemical composition, their antigenic properties, bacteriophage genetics, lysogeny, and colicins and bacteriocins. A useful glossary is included.

Mark Adams, through a widely read treatise called "Methods of Study of Bacterial Viruses," which appeared in Methods in Medical Research, Vol. 2, Yearbook Publishers, Chicago, Illinois, taught innumerable phage investigators the A B C's of virology. They, in turn, in countless publications acknowledged their teacher by having their bibliographies or reference lists begin "Adams, M. H. 1950 . . .". The editors have had the genius to include an expanded version of this writ of viral methodology as an appendix to the present volume. To two friends of Adams, Nancy Collins Bruce and Rollin D. Hotchkiss, embodiments, respectively, of sweetness and light, we are greatly indebted for revising the "Methods."

The publishers are to be tweaked for the cheap binding given these august pages. This reviewer's personal copy developed an interfascicular rent between Chapters I and II on the first perusal.

Lane Barksdale

SPRING FLOWERS OF THE LOWER COLUMBIA VALLEY. Hill, Clara Chapman. 164 pages, illustrated by Mary Comber Miles, indexed. University of Washington Press, Seattle, Washington. 1958. $3.00.

This is a handbook designed primarily for the use of persons with no previous background in taxonomy. Technical terms are reduced to a minimum, with a glossary provided for those of necessity employed.

The book includes most of the common conspicuous "wild flowers" blossoming through spring and into early June, in the area of Portland and adjoining counties. A simplified key for genera accompanies the descriptions; and specific keys are provided, also, for the larger genera. Comments on Indian uses of native species, together with adaptability of many to modern gardens, add interest; while the clean graceful full-page line drawings of many species help make this publication a usable and useful handbook for anyone wishing to become acquainted with the early-flowering plants of the area.

Dr. Helen M. Gilkey
Oregon State College
Corvallis, Oregon

VASCULAR PLANTS OF THE PACIFIC NORTHWEST. Part IV. Hitchcock, C. Leo, Arthur Cronquist, Marion Ownbey & J. W. Thompson. 510 pages, illustrated, indexed. University of Washington Press, Seattle, Washington. 1959. $12.00.

This substantial volume, the second of five scheduled to appear in reverse order, covers the sympetalous families from heather to bellflower, the authorship being divided between Prof. Hitchock (*Ericaceae* to *Cuscutaceae*), Dr. Cronquist (the remainder except for the Indian paintbrushes) and Prof. Ownbey who contributes a revision of the large and difficult genus *Castilleja*.

Part IV fulfills the promise made by Dr. Cronquist's *Compositae* (issued 1955, reviewed in this Journal, vol. 6, p. 132) which has been justly praised as an original contribution to systematic botany transcending the ordinary check-list type of flora. Throughout the work so far published there is every sign of lively and critical intelligence, and the many novel taxonomic opinions expressed there are backed up by well-argued explanatory notes. The figures are clear, generously proportioned, and of con-

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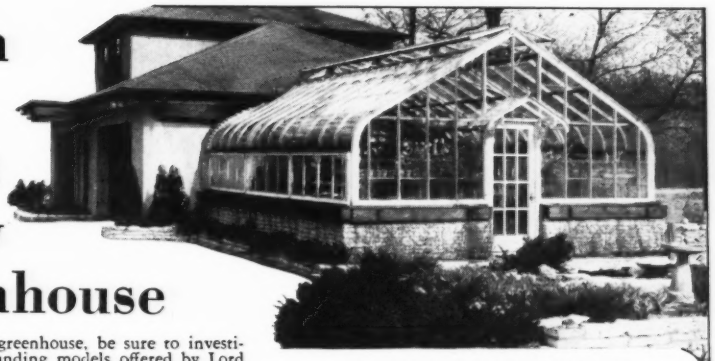

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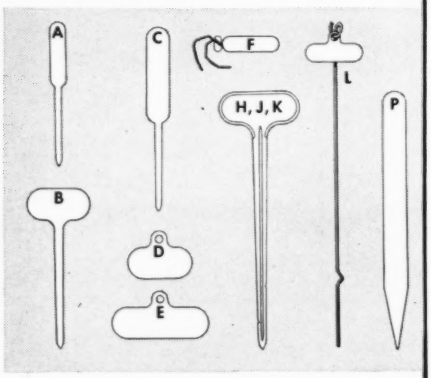

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siderable artistic merit. A feature of part IV is the addition of short horticultural notes, but it should be borne in mind that the cultural advice is directed principally toward gardeners in the Pacific Northwest, especially the Puget Sound area, and is not always sound for eastern United States or Europe.

Floras have always been costly productions and this one is no exception. We can only regret that funds were insufficient for regular type-face instead of lithographic reproduction, where the underlined (conventionally italicized) *synonym* catches the eye and deemphasizes the accepted name. The alphabetical arrangement of genera and species saves some index space and avoids numbering the figures, but these are false economies. The scattering of the *Monotropeae*, for example, among the leafy heathers, and the mixture of annual cryptanthas with perennial oreocaryas makes comparison of related species needlessly difficult. The alphabetical sequence is handy, if you know a plant's name in advance, or have worked through the generic key; otherwise it is a decided hindrance and also a vexation.

Apart from these negligible complaints nothing but warm praise is due to the authors of a Flora which has been needed for many years. Its completion will be awaited with impatience.

RUPERT C. BARNEBY
Wappinger Falls, New York

FLORA OF THE BRITISH ISLES, PART I PTERIDOPHYTA—PAPILIONACEAE, A. R. Clapham, T. G. Tutin, E. F. Warburg. Drawings by Sybil J. Roles. 144 pages, illustrated, indexed. Cambridge University Press, New York. 1957. $5.00.

Many popular and semi-popular illustrated books are to be had on the British flora. There is only one modern, complete, and taxonomic work known to me: this is the FLORA OF THE BRITISH ISLES, by Clapham, Tutin, and Warburg, published in 1952. The present volume is companion to that work, bearing the names of the same authors but consisting almost entirely of illustrations. The species represented in this first part are those described in approximately the first third of the Flora. (The order of families adopted by these authors is that of Betham and Hooker rather than the Englerian system of our own current floras and manuals.)

This volume of figures is in a larger format than the Flora, doubtless for reasons of economy in engraving. Librarians will deplore this, since it makes it difficult to shelve the two together: but this is of less importance to the private user. In general, there are four species illustrated on each page (a few pages show varieties). Each is represented by a "habit sketch" and a few diagnostic details, such as achenes of *Ranunculus,* siliques of Cruciferae, flowers of *Viola*; almost all drawn from living material. The drawings have not the technical mastery of line and texture of Stella Ross-Craig's well-known series, nor do they show so many details. The authors, indeed, admit in their introduction a somewhat limited function for them, that of conveying mainly the "general appearance" of the species illustrated. Nevertheless they form a useful adjunct to the Flora and will be helpful to any one getting acquainted with British plants. They are labeled with English and Latin names, a few of the latter having been brought up to date. The specimens used are preserved — a highly commendable practice.

H. W. RICKETT

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We believe a body of "where-to-buy" information in the advertising section of The Garden Journal is a distinct advantage to you, our readers. For this reason we are making an effort to convince a selected group of advertisers that The Garden Journal is carefully read by a devoted group of gardeners . . . gardeners who read and respond to their advertising.

As an official publication of The New York Botanical Garden, we are very sensitive to our responsibility to you. For this reason we have placed two restrictions on the acceptance of advertising in The Garden Journal:

(1) Subject matter must be limited to seeds, bulbs, plants, fertilizers and chemicals, tools, and gardening books—items that are pertinent to the editorial material;

(2) Claims by advertisers must be reasonable and substantiated.

We shall continue to do our best to insist that the advertising in The Garden Journal's columns conform to these restrictions, and therefore we believe our readers can buy from our advertisers with utmost confidence.

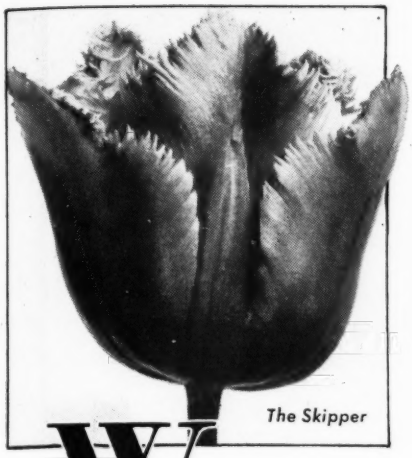
When doing business with them, please mention The Garden Journal.

TREE FRUIT PRODUCTION, James S. Shoemaker and Benjamin J. E. Teskey. 456 pages, illustrated, indexed. John Wiley & Sons, Inc., New York. 1959. $6.95.

The scope of this book is indicated by the number of pages devoted to the various tree crops, namely, apple 130 pages; pear 31; dwarf apple and pear 15; peach 109; cherry 62; plum 25; apricot, nectarine, and quince 12; and citrus 27. Without these last 27 pages, the title might have been "Deciduous Fruit Trees of the North Temperate Region." Although half of the book is devoted to the apple and the peach, many of the topics discussed for these two fruits are general in nature and can be applied to other tree fruits as well. A list of 803 references to scientific literature and a good index, complete the book.

The book is written, in the words of the authors, "to answer the need of students, teachers, and others who require the most up-to-date information on the production of tree fruits. Included in the discussion are subjects which confront every grower of these fruits and every student of pomology." They have seemingly accomplished this objective.

Each chapter is conveniently subdivided into sections and paragraphs devoted to special practices. The book is well illustrated, nicely printed, and gives an air of openness and cleanness. The authors have employed



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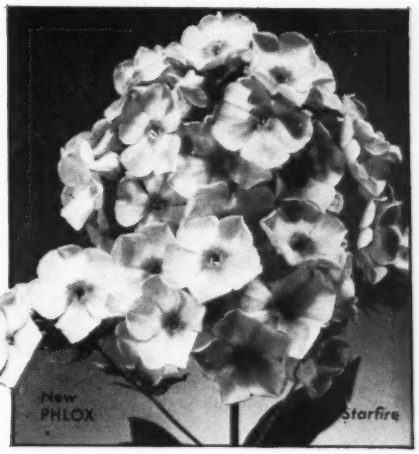

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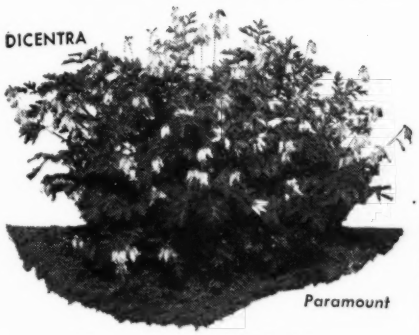

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H. B. TUKEY, *Head*
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ESSENTIALS OF FORESTRY PRACTICE, Charles H. STODDARD. 253 pages, indexed, illustrated. The Ronald Press, New York. 1959. $5.50.

This is a very good introduction to forestry. It should be particularly useful in introductory college courses in professional forestry curricula, in forestry orientation courses in agricultural and ranger school curricula, and to the landowner student, or conservationist. This is a book for the man who wants a handy reference to general basic information on the elements that make up the field of forestry, how the profession is organized in the United States, and data on the forest resource and how this resource is used.

By organizing chapters along the lines of college course titles in forestry schools, the author has assured the reader a logical and comprehensive breakdown of subject matter. The book deals with forestry history, legislation, education, tree growth, forest composition, silviculture, measurement, management and finance, logging, protection, and utilization. The multiple use of the forest is mentioned for things other than timber, such as water, game, grazing, recreation, etc. A useful appendix is provided of particular help to those considering forest management plans.

While the book is generally in good balance, it leans heavily toward timber, in the traditional manner. In this new day of multiple use, the value of many forest areas is often greater for water, recreation, or grazing than for their wood products. The book treats these subjects, and the tremendously important field of forest research, lightly.

The author provides an unusually well-chosen set of up-to-date photographs and other illustrations that add much to the book's value. He has also used modern source material for his resource data.

GEORGE H. HEPTING
U.S. Forest Service
Asheville, North Carolina

TREES OF CENTRAL AFRICA. Painted by Olive H. Coates Palgrave, described by Keith Coates Palgrave, photographed by Deric and Paul Coates Palgrave. 110 full page color plates, 110 full page photographs. 466 pages, quarto. Printed in Glasgow for the National Publications Trust of Rhodesia and Nyasaland, Salisbury, Northern Rhodesia. $12.00

This ambitious undertaking represents the life work of Mrs. Palgrave in collecting and painting horticultural examples of one hundred and ten principal species of trees of her country, the flowers, leaves, stems, fruits, practically all of them life size. Now her thirty years' effort are supplemented by the scholarly help of her three children. The whole is presented by Mrs. Palgrave as a memorial to her husband, who long hoped her paintings might be used to assist the children of Rhodesia to know and appreciate the beauty of the flora of their homeland. This truly monumental family work could have been achieved only by public subscription.

Not only are the colored illustrations superb, but Deric and Paul have supplemented each entry with fine habitat photographs of the trees in the wild, plus inset photographs of the bark of each one. Obviously the Palgraves traveled many hundreds of miles to get their pictures, plus flowers, leaves and fruits of each species at the appropriate times of year, so that the artist might reproduce these features from live specimens.

With all this pictorial material to inspire him, the author of the descriptions has done well, restricting his efforts to the correct botanical and common names, both English and native, a brief analysis of botanical characteristics, and some facts on distribution of the tree and the usefulness of the timber or other tree products.

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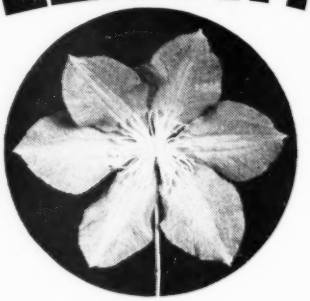

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Collecting, recording, and trying to spell and pronounce the native names for these one hundred and ten trees, with several different tribes involved, was a colossal task in itself, particularly as the natives have several sounds in their language for which there is no English equivalent, and phonetic approximations are necessary. This part of the project, including an index of these strange words, has been well carried out.

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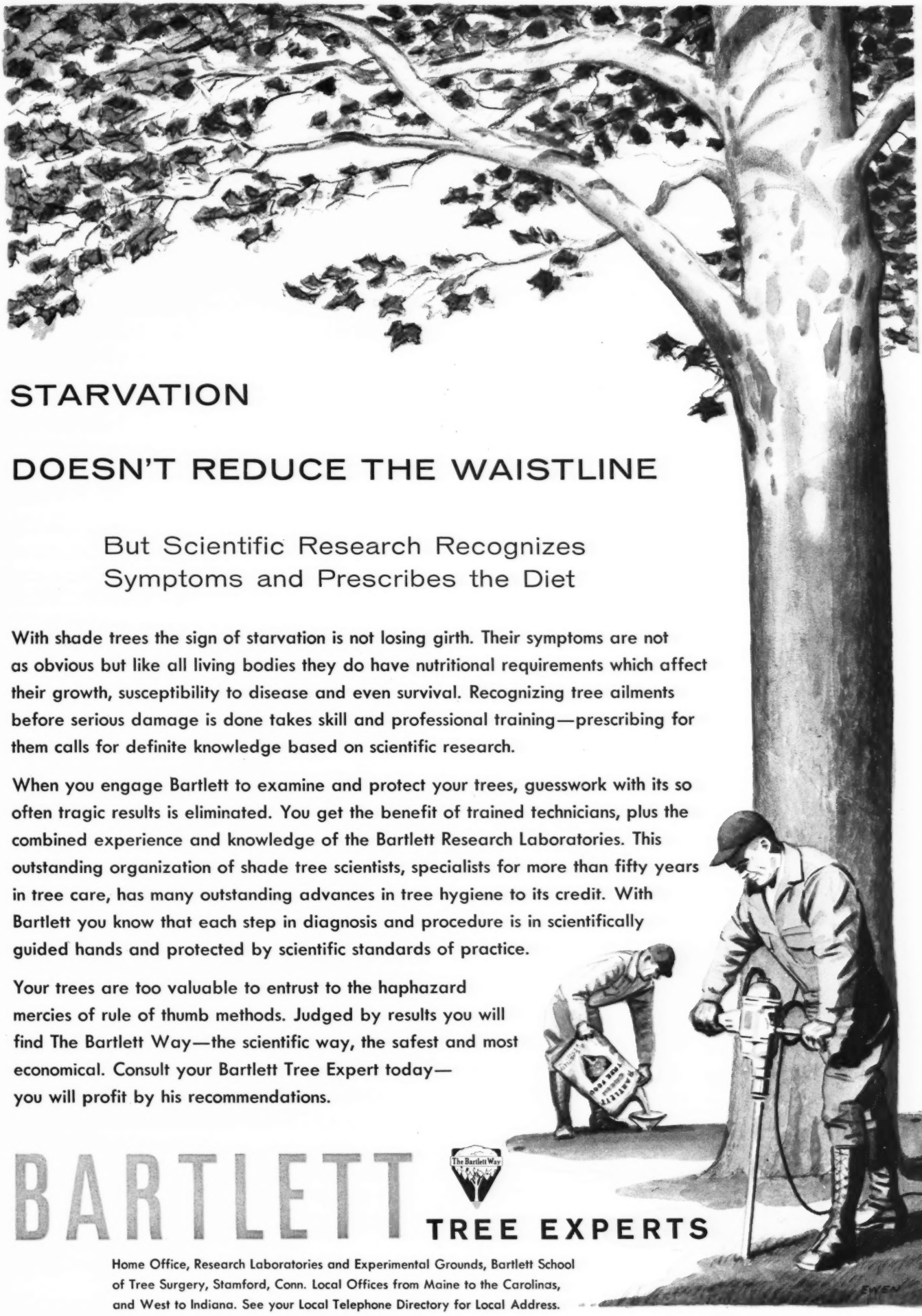

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